United States Department of Agriculture
Forest Service

DRAFT Sweet-Ione Vegetation Management Project: Biological Evaluation

Newport-Sullivan Lake Ranger Districts

Colville National Forest

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1.0 Introduction

The USDA Forest Service, Colville National Forest (CNF) proposes to manage timber and other forest resources on National Forest System (NFS) lands in the Sweet-Ione Project Area. Proposed activities would include temporary road construction, timber harvest, post-harvest road closures, post-harvest fuels reduction, and habitat improvements. This report is an analysis of the effects of the project to threatened, endangered, and candidate species listed under the Endangered Species Act of 1973 (T&E species).

There are two issues associated with this project in relation to terrestrial T&E species: forest management in the range of Canada lynx, and the availability of seclusion habitat.

1.1 Project Area Description

The Sweet-Ione Project Area covers approximately 20,434 acres (31.9 square miles) within the Selkirk Mountain Range of northeastern Washington State. Private lands along the Pend Oreille River border the project area to the east. The town of Ione is located on the southeast edge of the area. On the western edge is a major watershed divide that separates the Newport-Sullivan Lake Ranger Districts from the Three Rivers Ranger District. The northern edge of the project area abuts the Abercrombie-Hooknose Roadless Area. Most of this rugged, remote area is recommended for wilderness status in the Colville National Forest Land Management Plan (USDA 2019), hereafter referred to as the Forest Plan. Wilderness areas are designated by an act of Congress.

The project area includes most of the Big Muddy Creek Watershed and portions of the Sweet Creek Watershed. There are no lakes within the project area boundary, but Big Meadow Lake lies just outside the southwest corner of the area. Some larger wetland complexes are typically associated with the major creeks in the area.

A small portion of a mapped secondary range area for Canada lynx overlaps the high-elevation, northwest corner of the Sweet-Ione Project Area. The Pend Oreille River Valley separates the project area from the Selkirk Mountains Grizzly Bear Recovery Zone. Although the project area is outside the recovery zone, it within watersheds classified by the USDI Fish and Wildlife Service (2020) as those where "bears may be present," based on recent documented occurrences. Winter ranges for deer and elk occur on the lower elevations in the eastern portions of the project area.

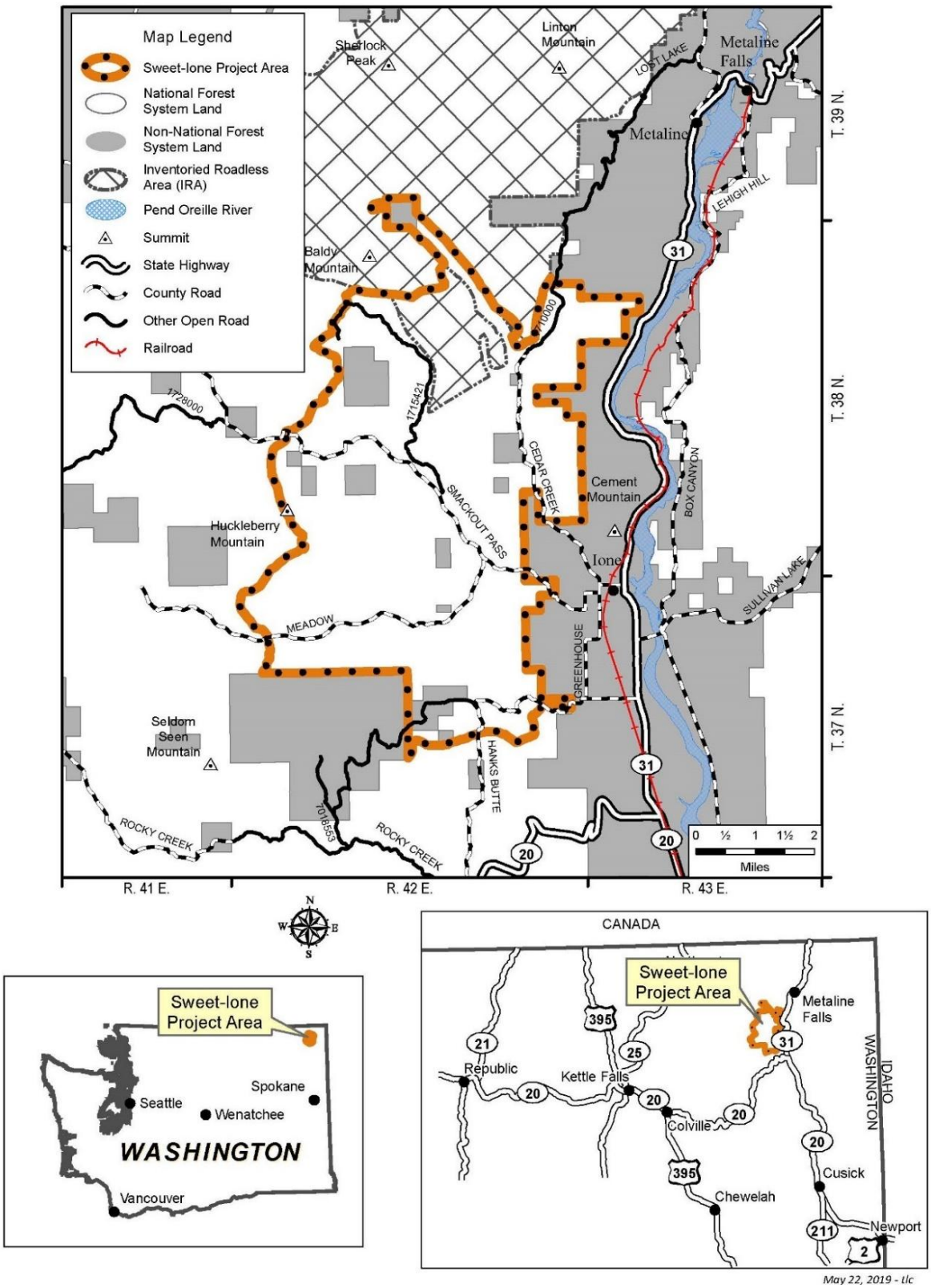

Figure 1. Sweet-Ione Project Area vicinity map

1.1.1 Forest Plan Management Areas

The Forest Plan divided the NFS lands within the administrative boundary of the forest into several different "Management Areas" (MAs). Each MA has its own management emphasis. The following table lists the land ownerships and various Forest Plan MAs within the Sweet-Ione Project Area. Note that "some MAs naturally overlap with other management areas. Combinations of activities or uses are dependent on site-specific conditions, making it unreasonable to include all combinations and the applicable plan direction within the Forest Plan. Therefore, applicability of plan direction is guided by the principle that, where management areas overlap, the most restrictive plan direction applies depending on site-specific conditions and the activity or use" (USDA 2019).

Table 1. Land ownership and CNF Forest Plan (USDA 2019) management areas in the Sweet-Ione Project Area

Ownership	Forest Plan management area	Management emphasis	Timber harvest permitted?	Approx. acres
National Forest System (NFS)	Backcountry	Provide non-motorized recreation opportunities, wildlife habitat	no, unless consistent with RACR[1]	1,530
NFS	Focused Restoration	Restore ecological integrity and ecosystem function	yes	5,825
NFS	General Restoration	All areas not included in another management area	yes	11,345
NFS	Scenic Byway	Protect scenic values and recreation use within 0.5 mile of the International Selkirk Loop	yes, in support of scenery mgt. objectives	165
NFS	Riparian Mgt. Areas (RMAs)	Aquatic and riparian dependent resources	yes, in support of desired conditions	overlay with other MAs
Total NFS				**18,865**
Private, WA Dept. of Natural Res.	NA	timber production	according to WA forest practices	**1,569**
Project area				**20,434**

1 Roadless Area Conservation Rule

As displayed in Table 1, most of the NFS lands in the project area lie within either the Focused Restoration or General Restoration MAs. Forest Plan direction specific to wildlife habitats in these MAs is mainly related to road densities, as described below.

MA-DC-FR-02 Habitat (page 106)

A desired condition of the Focused Restoration MA is to "contribute important habitat for plant, wildlife, and aquatic species that benefit from areas with a relatively low road density and high habitat effectiveness (relatively low level of human disturbances)."

MA-DC-FR-05 Travelways, Roads (page 107)

Road densities will vary across the Focused Restoration MA, but the desired condition is to have no more than 1 mile of drivable National Forest System (NFS) road per square mile of NFS lands.

MA-DC-GR-02 Habitat (page 109)

A desired condition of the General Restoration MA is to "contribute habitat for plant and animal species that are relatively tolerant of human activities and disturbances."

MA-DC-GR-05 Travelways, Roads (page 110)

Road densities will vary across the General Restoration MA, but the desired condition is to have no more than 2 miles of drivable NFS road per square mile of NFS lands.

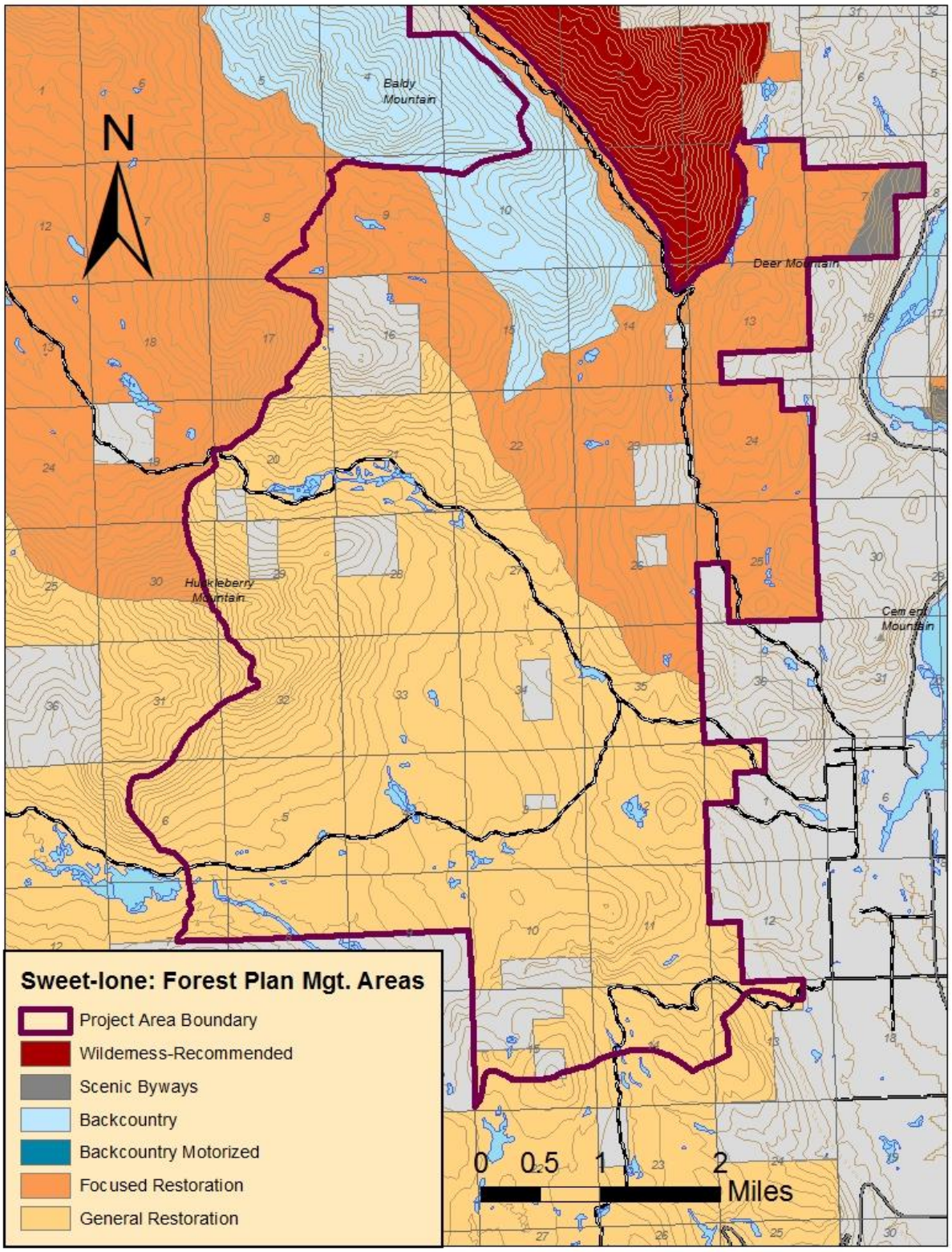

Figure 2. Sweet-Ione Project Area: 2019 CNF Forest Plan management areas

1.1.2 Current Vegetation

The project area is predominantly forested with often dense stands of conifers. The Dry Douglas fir and Northern Rocky Mountains Mixed Conifer vegetation types are the most prevalent. Mesic Western redcedar / Western hemlock vegetation types occur on sheltered aspects and along drainages. Subalpine fir / Engelmann spruce and Subalpine fir / Lodgepole pine vegetation types occur in the highest elevations along the western and northwestern boundaries of the project area. Quaking aspen and paper birch are a minor component of many timber stands. Most timber stands in the area originated after intense wildfires that occurred in the late 1920s / early 1930s.

Forest openings in the project area are predominantly the result of more recent timber harvest. Permanent openings in the project area include a few old homestead meadows, small wetlands, and two power transmission line corridors, which are typically maintained every 3-5 years.

1.1.3 Existing Transportation System

Table 2 displays the miles of roads within the Sweet-Ione Project Area. We mapped approximately eight (8) miles of unauthorized roads in this project area based mainly on LiDAR imagery. These routes have revegetated to one degree or another, but some appear to be used by off-highway vehicle (OHV) riders that originate from the nearby town of Ione. Thus, we classified these routes as open, motorized routes.

Table 2: Sweet-Ione Project Area - existing transportation system data
(Project area = 31.9 square miles)

Open routes	**Approximate miles**	**Route density (mi. / sq. mile)**
National Forest System roads	53.5	1.68
county roads	19.8	0.62
private roads	2.7	0.08
unauthorized roads / OHV trails	8.0	0.25
Total open routes	84	2.63
Restricted access roads		
gated roads with some administrative traffic but no authorized public use	25.9	0.81
Total drivable routes		
open + restricted routes	109.9	3.45
Un-drivable routes		
roads effectively closed with guardrail barricades, earthen berms, boulders, or brush with no vehicle traffic evident	0.7	0.02

1.1.3.1 Motor Vehicle Use Maps

The CNF published the first Motor Vehicle Use Maps (MVUM) for the forest's transportation system in 2005. These maps display roads and trails that are designated as open to motorized travel, and the types of vehicles permitted on each route. If a route is not open to motorized vehicles, it does not appear on the map. Off-road travel is now prohibited on the forest, except to access an established, dispersed campsite within

300 feet of an open road. Off-road travel for wild game retrieval is prohibited. MVUM maps are free of charge and hundreds of copies have been distributed to the public through the CNF offices, law enforcement officers, and other Forest Service employees in the field. Within the Sweet-Ione Project Area, there are several routes open to off-highway vehicles (OHVs) as shown on the latest edition of the MVUM.

2.0 Proposed Action

This project would be primarily designed to:

- Reduce accumulated understory fuels and fuel ladders. Restore fire to its historic function.
- Reduce wildfire risk to local communities and surrounding lands.
- Reduce the susceptibility / increase resiliency of trees to insects and diseases by reducing stand density.
- Restore early seral tree species (ponderosa pine, western larch, western white pine) that have been reduced by historic over-harvest, fire suppression, and white pine blister rust.
- Move the area closer to its Historic Range of Variability (HRV) for stand structural stages.
- Decrease road densities in the project area to reduce road maintenance costs, improve in-stream water quality, and increase seclusion habitat for elk and other wildlife.
- Restore habitat connectivity for aquatic wildlife and improve hydrologic function.

2.1 Vegetation Management

The following tables display the vegetation management activities that would occur with the Proposed Action.

Table 3: Proposed commercial timber harvest (all values are approximate)

Commercial Activity	Total Acres	Comments
Harvest Prescriptions		
Shelterwood	1,240	Harvest all trees except about 12-25 trees per acre. Generally, retain the largest, most vigorous appearing trees to provide a seed source, shelter for existing regeneration, and wildlife habitat. The intent of this prescription is to establish a two-aged stand of the most desirable species for the site. Most of the overhead tree canopy would be removed (created openings). Where there is a lack of natural regeneration or desirable seed trees post-harvest, plant these areas with trees grown at the nursery.
Commercial thin	3,505	Thin out the stand focusing on removing the suppressed and less vigorous appearing trees with the smallest crowns. Increase the growing space for the largest and most vigorous appearing trees, thereby accelerating their growth and moving the stand towards a late structural stage. Overhead canopy closure would be reduced for perhaps 15-20 years, until growing tree crowns fill in the canopy gaps.
Mixed harvest	3,135	Harvest with both shelterwood (approx. 1,881 acres) and thinning (approx. 1,254 acres) prescriptions, depending on within-stand conditions.
Total Acres	**7,880**	All values are approximate Expected timber volume = 40-60 million board feet (MMBF)

Commercial Activity	Total Acres	Comments
Logging Systems		
Ground based (tractor)	7,815	Cut trees with chainsaws or with tree shearing equipment. Drag trees to a landing site using track-mounted or rubber tire skidders. This method is usually used on slopes less than 40 percent.
Skyline	65	Move cut trees to a landing using a suspended cable attached to a mobile tower parked on a road. This method is used on slopes greater than 40 percent.
Total Acres	**7,880**	All values are approximate

Table 4. Proposed non-commercial vegetation treatments (all values are approximate)

Non-Commercial	Acres	Comments
Fuels Treatments		
Grapple pile and burn piles	5,335	Machine pile logging slash within commercial harvest units to reduce fuel loads that exceed objectives for large woody material and soil productivity. Piles are often burned.
Grapple pile, burn piles, then under burn	385	Same as above, followed by under burning.
Under-burn within harvest units	2,160	Use prescribed fire to reduce logging slash, remove undesirable regeneration, promote the growth of fire-adapted tree species, and rejuvenate grasses and desirable browse species for wildlife.
Total Acres	**7,880**	All values are approximate
Other Vegetation Treatments		
Pre-commercial thin, hand pile cut trees and burn piles Prune white pine trees	890	Thin seedling to small pole-sized trees (typically < 7 inches in diameter) to a set spacing (typically 12 feet) and by species priority. Remove the lower branches of young western white pine trees (no greater than 1/3 the total height of the tree) to reduce the potential for white pine blister rust infection. Treatments would occur on approximately 575 acres outside of harvest units and 315 acres within harvest units. If necessary, the cut trees and branches would be piled. Piles might be burned.
Fall whips	3,380	Remove undesirable seedling to small pole-sized trees to release desirable regeneration and enhance huckleberry patches. Treatments would occur within harvest units and in areas proposed for under-burning outside harvest units.
Plant trees	3,400	Re-establish trees through planting in openings created by timber harvest, in forest openings created by insect and disease attack, along stream corridors (425 acres) where needed to increase shading or long-term coarse wood recruitment, on decommissioned roads, and on closed road entrances.
Under-burn outside harvest units	865	Use prescribed fire to reduce the risk of uncharacteristic wildfires. The intent would be to reduce surface fuels, stand understories and fuel ladders; raise the live crowns of overstory trees; promote the growth of fire-adapted tree species; and rejuvenate grasses and desirable browse species for wildlife.
Aquatic wood source	355	Selectively thin trees 15+ inches in diameter to be placed in streams to improve

Non-Commercial	Acres	Comments
units		habitat complexity. Trees could be cut and moved to the stream or felled directly into the stream. In some cases, root wads would remain intact. Canopy closure at the stand level should not be affected.
Total Acres	**8,025**	All values are approximate.

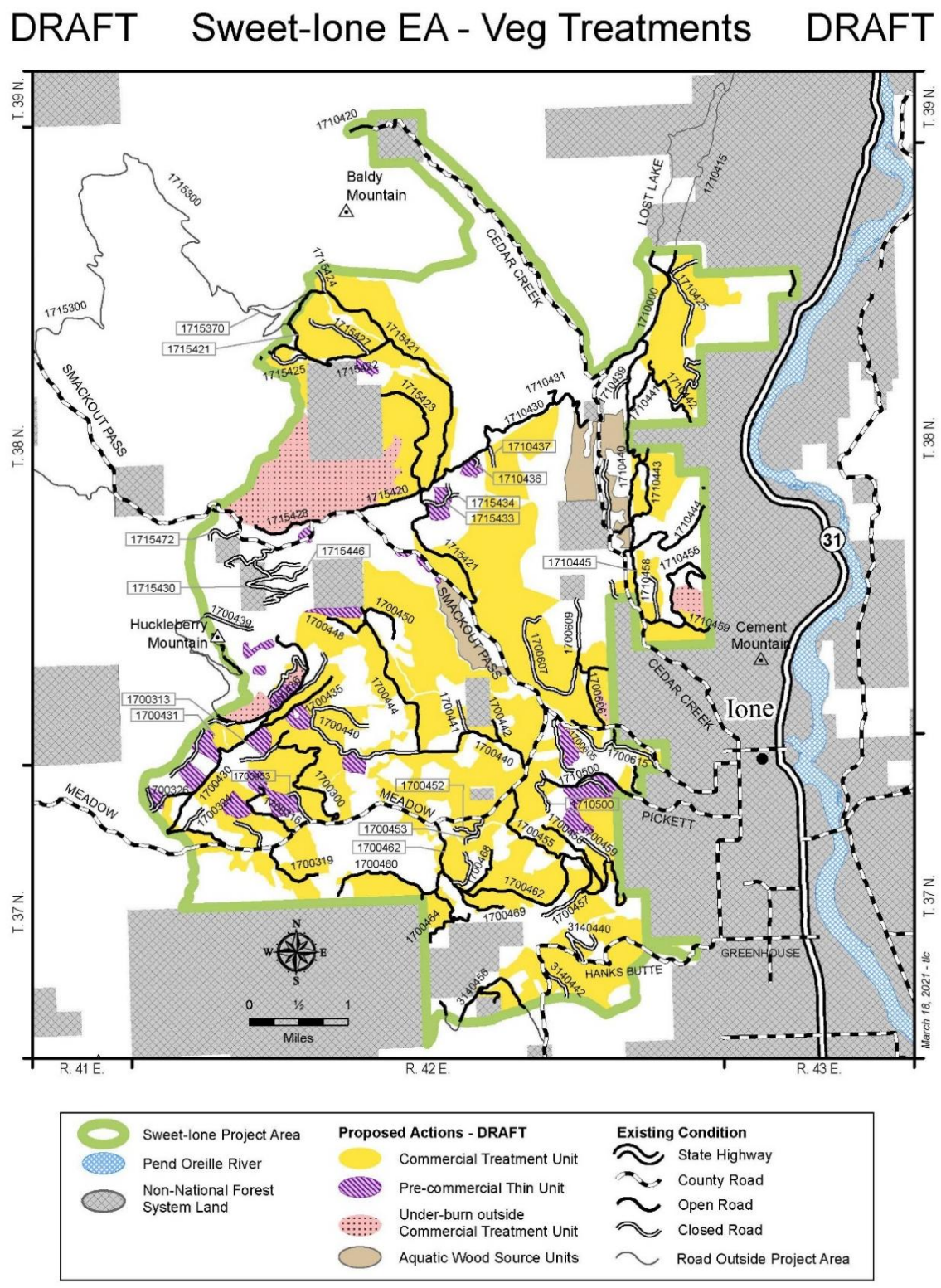

Figure 3. Proposed vegetation treatments

2.2 Road Management

Table 5 displays the work proposed on the transportation system in the project area.

Table 5: Sweet-Ione Project Area – Proposed road work (all values are approximate)

Proposed Road Work	Length (miles)	Comments
Build new temporary roads to complete forest management activities	8.0	Use old road templates, old skid trails, and other previously impacted areas to the fullest extent possible. Keep closed to public (motorized) use with gates or other means. Following their use, render the roads un-drivable with native materials (ex., earthen berms / boulders / plantings).
Close existing open NFS roads	3.5	Close to public (motorized) use with gates or other means. For those roads which access NFS lands only, replace gates with earthen berms / boulders installed on the road entrance, post-project.
Decommission existing roads	9.0	These road segments may include currently open or closed roads. They are not necessary for future forest management and are often potential sources of sediment input to streams. Render the roads un-drivable with native materials. Remove from the CNF's Transportation System.
Net change in **open** NFS road miles		Change in existing NFS open road miles
Obliterate unauthorized roads / OHV trails		Render these routes un-drivable using native materials.
Net change in **open** motorized route miles	- 13.0	Change in total miles physically open to motorized use.
Allow off-highway vehicle (OHV) use on a road presently open to highway legal vehicles only	1.5	Change the status of FR 1715421 from its intersection with FR 1715422 to its intersection with FR 1715370, on the Motor Vehicle Use Map.
Smackout Gravel Pit	up to 5 acres	Construct a gravel pit to provide materials for road work. Stockpile soils on site to be used for future reclamation.

We do not presently propose further reductions in the open road miles in the Sweet-Ione Project Area for the following reasons:

- The Forest Service has no jurisdiction over state, county, or privately owned roads in the area.
- We are required to provide reasonable (i.e., road) access to private in-holdings on the forest per the Alaskan Native Interest Lands Conservation Act.
- The Bonneville Power Administration and Pend Oreille County Public Utility District #1 require road access to service power transmission line infrastructure and maintain power line corridors.
- The US Air Force desires continued open road access on specific roads for their Survival School training exercises.
- Some open road access is also needed / desired for forest recreation, special forest products collection (ex., firewood), and range allotment permit administration.

The photos on the following pages are typical of the road closure / obliteration work we complete on the forest. The road template behind the closure in Figure 5 is intact and could be re-opened for future forest management. The road in Figure 6 was not needed for future forest management and has been removed from the CNF's Transportation System.

Figure 4. Temporary road that has been fully obliterated.

Figure 5. Road entrance that has been effectively closed with native materials.

Figure 6. Fully obliterated road that was located within proximity to a stream

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2.3 Habitat Improvements

Table 6 displays the work proposed to improve or restore aquatic or terrestrial habitats in the project area, and to improve hydrologic function.

Table 6: Sweet-Ione Project Area – Proposed habitat restoration / improvements (all values are approximate)

Proposed habitat improvements	Units	Comments
Aquatic / Terrestrial Habitat		
Place large woody debris in streams	12.0 miles	Within Large Woody Material placement (LWM) units, utilize cut trees to increase in-stream cover and habitat complexity. Wood may be imported, or trees could be felled on-site for placement in streams.
Remove or upgrade culverts	25 culverts	Remove or upgrade structures that are impeding aquatic organism passage in streams.

Proposed habitat improvements	Units	Comments
Remove log crib dam	1 structure	Restore in-stream channel function
Terrestrial Habitat		
Maintain / restore meadows	35 acres	Maintain or improve early seral meadow habitat through a variety of actions such as small conifer thinning / removal and seedings.
Create log jackpots for rare carnivores	3 structures	On the lynx range, provide micro-sites of concealing cover for lynx and other rare forest carnivores. Pile at least 3-5 layers of larger (9-14 inch) down logs crisscrossed or lain lengthwise in triangular groupings of 3 logs. Cover the top with a few layers (about 2-3 feet) of branches and other small material.

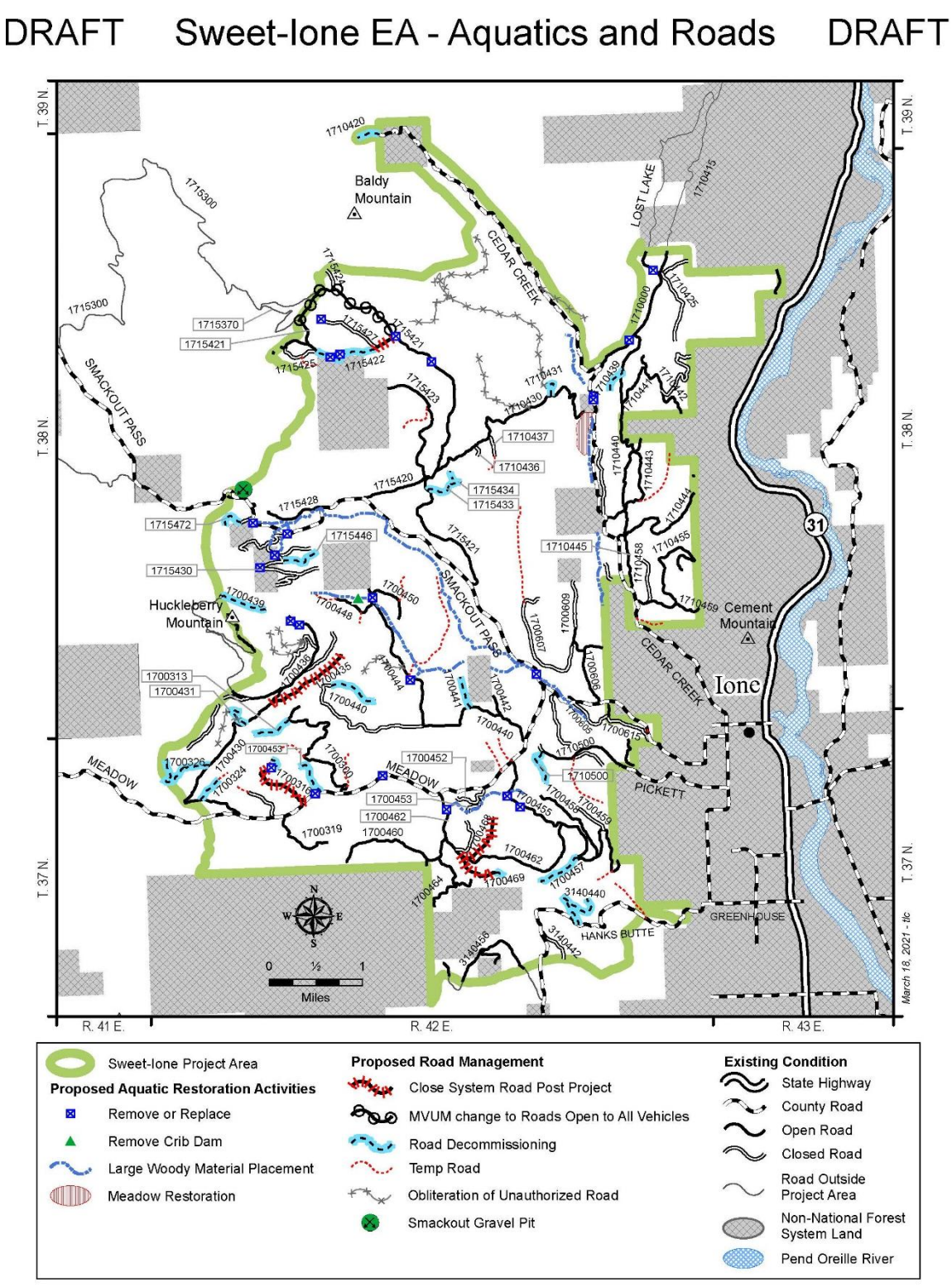

Figure 7. Proposed road management and habitat improvements

2.4 Wildlife Standard Practices and Design Elements

Wildlife standard practices are those actions we have consistently applied with our forest management projects to conserve wildlife habitats. They are often focused on fine-scale habitats (ex., large snags) that are commonly found in most, if not all activity areas of a project. These would be best identified on the ground by forest workers during project preparation (ex., harvest unit layout, tree marking), or implementation. Other standard practices pertain to maintaining higher canopy closure in riparian management areas (RMAs) and managing the road system during and after the project.

Wildlife design elements may change from project to project, and normally apply to specific project activity areas. They may be intended to protect wildlife from human disturbance, or to conserve known biological sites or use areas (ex., raptor nest stands). Design elements may also be intended to mitigate for potential project impacts to habitats.

Criteria in the following tables would be incorporated into the design of the Proposed Action. These practices have proven to be effective in avoiding or minimizing the potential negative effects of vegetation management projects to native wildlife species on the forest.

Table 7. Standard practices for terrestrial wildlife. These practices would apply to all project activity areas that contain these features.

Standard Practice	Forest Plan Desired Condition (DC), Standard (STD), Guideline (GDL), and Selected Supporting Documents
Newly Discovered TES Species and Biological Sites If a threatened, endangered, or sensitive wildlife species is observed in the project area, or if a previously unknown wildlife activity site (e.g., raptor nest, large carnivore den, cave, mine) is discovered, consult the district wildlife biologist on measures that might be necessary to protect the species or site.	*FW-DC-WL-11. Human Activities in Bald Eagle Nesting Areas* (page 60) *FW-STD-WL-01. Nest Sites* (page 62) *FW-GDL-WL-03. Unique Habitats* (page 64) *FW-GDL-WL-16. Bat Habitat Protection* (page 66) *FW-GDL-WL-18. Nest Sites* (page 66) *FW-GDL-WL-19. Northern Goshawk Nesting Sites* (page 67) Standard FS timber sale contract clause B6.24
Large Live Trees If live trees 20+ inches in diameter at breast height (DBH) are proposed for harvest, provide clear rationale as to why the removal of smaller trees alone cannot achieve the stated desired conditions.	*FW-DC-VEG-05. Biological Legacies* (page 37) *FW-GDL-VEG-03. Large Tree Management* (page 41-42)
Snags and Coarse Woody Debris Retain snags that are 10+ inches DBH except those that must be felled within new road or equipment corridors, log landings, or for worker safety. When trees must be felled, retain all 14+ inch bole pieces on site to contribute to down log levels, as feasible. Retain existing down logs that are 14+ inches at the large end, in 33+ foot pieces. Retain additional logs to meet the desired levels of coarse woody debris in the Forest Plan (see the Dead Wood Habitats section of this report).	*FW-DC-VEG-05. Biological Legacies* (page 37) *FW-DC-VEG-04. Snags and Coarse Woody Debris* (page 36) *FW-STD-WL-12. Large Snag Habitat* (page 64) Altman and Bresson 2017, Bull et al. 1997, Gervais 2015, Mellen-McLean et al. 2017
Biological Legacies Retain up to 12 live trees per acre (14+ inches DBH) from the following list:	*FW-DC-VEG-05. Biological Legacies* (page 37)

Standard Practice	Forest Plan Desired Condition (DC), Standard (STD), Guideline (GDL), and Selected Supporting Documents
- hollow trees (grand fir, western larch, western redcedar), - trees with broken tops, dead tops, or heart rot fungi such as Indian paint, - trees with woodpecker cavities / excavations, - trees with broom rusts (spruce, subalpine fir, grand fir), Elytroderma brooms (ponderosa pine), or dwarf mistletoes (western larch, Douglas fir), - open grown "wolf trees" with spreading crowns.	Bull et al. 1997, Mellen-McLean et al. 2017
Hardwoods Retain hardwood trees except those that must be cut down within new road or equipment corridors, log landings, or for worker safety.	*FW-DC-VEG-01. Plant Species Composition* (page 34) *FW-GDL-WL-03. Unique Habitats* (page 64) Altman and Bresson 2017, Bull et al. 1997, USDI 2008
Riparian Management Areas (RMAs) Complete timber harvest and other vegetation treatments within RMAs *only* as necessary to attain desired conditions for aquatic and riparian resources. If treatments are proposed within RMAs, ensure that a high degree of overhead canopy (60+ percent target) is maintained within the moist vegetation types, averaged over that portion of a unit within the RMA. Maximum RMA widths are provided on pages 119-120 of the Forest Plan.	*FW-DC-WR-01. Natural Disturbance Regime of Aquatic and Riparian Systems* (page 50). *FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity* (page 50). *FW-GDL-WL-03. Unique Habitats* (page 64) *MA-STD-RMA-03. Timber Harvest and Thinning* (page 121) Altman and Bresson 2017, Duncan 2008, Foltz-Jordan, 2010 & 2011, Gervais 2015
Roads During the project, use gates or other means to prohibit unauthorized vehicle access on existing restricted (gated) roads, new roads, and presently un-drivable roads made drivable. As soon as possible following their use, close new roads, brushed-out roads, and selected open roads with gates or native materials (preferred). Monitor all closed roads for 5 years. If a road is receiving unauthorized motorized use, implement actions necessary to improve the effectiveness of the closure.	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* (page 59) *FW-OBJ-WL-14. Deer and Elk Habitat – Human Activities* (page 60) *FW-DC-WL-10. Risk Factors for all Surrogate Species* (page 60) Christensen et al. 1993, Trombulak and Frissell 2000, Rowland et al. 2005

Standard Practice	Forest Plan Desired Condition (DC), Standard (STD), Guideline (GDL), and Selected Supporting Documents
Roadside Hiding Cover Hiding cover is defined as vegetation or topography capable of concealing 90 percent of an elk at 200 feet. Where the opportunity exists, retain strips / patches of shrubs and trees to provide hiding cover along open roads adjacent to created openings (shelterwood and mixed harvest units). To the extent feasible, maintain this cover during post-harvest activities.	*FW-GDL-WL-01. Hiding Cover for Wildlife* (page 64) Thomas et al. 1979, USDI et al. 1986, Montgomery et al. 2013

Table 8. Project Design Elements for terrestrial wildlife. These practices would apply to the identified locations.

Design Element	Applicable Locations	Forest Plan Desired Condition (DC), Standard (STD), Guideline (GDL), and Selected Supporting Documents
Late-Closed Associated Species Habitat Retain sufficient habitat (unmanaged) to remain within HRV in the watersheds. There is an opportunity to thin selected habitat polygons in the Big Muddy Creek Watershed to improve stand health and tree growth. Retain 50+% canopy closure, averaged over the unit.	Units 135, 151, 164, 179, 188	*FW-DC-WL-03. Habitat Conditions for all Surrogate Species* (page 59) *FW-GDL-19. Northern Goshawk Nesting Sites* (page 67) McGrath et al. 2003, Moser and Garton 2009
Lynx Habitat Unless they are at risk of being lost to insects, disease, or senescence, retain patches of multi-storied trees as uncut "skips" in the identified units. Retain hiding cover on the ridge making up the western edge of Unit 1 to facilitate movement along the ridge, in consultation with the biologist.	Unit 1, and those portions of Units 2, 3, 6 which overlap the lynx range	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species*, (page 59) Interagency Lynx Biology Team 2013
Raptor Nest Timing Restriction Do not conduct project activities within 0.25 mile of active goshawk nests from March 1 to August 31, to avoid disturbance to birds during this critical period. This measure would apply to timber harvest, pre-commercial thinning, road construction and reconstruction, prescribed burning, mechanical fuels treatments, and other projects involving persistent heavy equipment operation. This measure would not apply to use of roads open to the public (i.e., for timber hauling) or to routine road maintenance / light reconstruction.	Units 135, 141, 142, temp road into Unit 41	*FW-STD-WL-01. Nest Sites* (page 62) McGrath et al. 2003, Moser and Garton 2009
Winter Range Timing Restriction To provide adequate seclusion habitat for	Cedar Creek: Units 11, 12, 13, 14, 19, 20, 21,	*FW-DC-WL-14. Deer and Elk Habitat – Human Activities* (page 60)

Design Element	Applicable Locations	Forest Plan Desired Condition (DC), Standard (STD), Guideline (GDL), and Selected Supporting Documents
wintering big game, conduct no project activities from December 1 to March 31 in the identified units.	22, 25, 26, 27 Big Muddy Creek: Units 72, 73, 76, 77, 79	*FW-GDL-WL-13 Mule Deer, White-tailed Deer, and Elk Habitat – Human Activities* (page 66)
Snag Creation If post-harvest snag levels in created openings do not meet those prescribed in Table 7 the Forest Plan (Page 36), top live green trees to create snags to mimic habitat levels in unmanaged stands. Consider topping groupings of trees, particularly in the Subalpine Fir vegetation types.	shelterwood and mixed harvest units	*FW-DC-WL-03. Habitat Conditions for all Surrogate Species* (page 59) Altman and Bresson 2017, Bull et al. 1997, USDI 2008
Log Pile Creation Where the risk of bark beetle spread is low, leave up to 10 percent of machine piles unburned, preferably away from roads and in wet / low lying areas. Ideally, retained piles would consist of at least 3-5 layers of larger (9-14 inch) logs crisscrossed, or lain lengthwise in triangular groupings of 3 logs. Cover the top with a few layers (about 2-3 feet) of branches and other small material. The intent would be to create habitat for small mammals.	units where logging slash would be machine piled	*FW-DC-WL-03. Habitat Conditions for all Surrogate Species* (page 59) Gervais 2015

3.0 Wildlife Topics and Issues Addressed in This Analysis

3.1 Canada Lynx Habitat

The Interagency Lynx Biology Team (2013) designated lynx range within the Selkirk Mountains (including the Sweet-Ione Project Area) as a "secondary area" for lynx. Secondary areas should be managed to provide a mosaic of forest structure that includes dense, early successional coniferous and mixed coniferous-deciduous stands, along with a component of multi-story conifer stands. Flexibility in the amounts and arrangement of various successional stages is acceptable, provided that a mosaic can be sustained. Vegetation treatments should be designed with consideration of historical landscape patterns and distribution processes.

3.2 Seclusion

Open and drivable road densities in the project area are high. This contributes to an increased risk of disturbance to wildlife and potential for displacement of animals from otherwise suitable habitat. In areas of high road densities, terrestrial T&E species could be more susceptible to incidental take from legal hunting and trapping, as well as from poaching.

3.3 Wildlife Resource Indicators and Measures

Table 9 displays the wildlife resource indicators related to this project and the measures we will use to gauge project effects.

Table 9. Resource indicators and measures for assessing project effects relative to the key T&E wildlife issues.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to Address P&N or a Key Issue?	Source
lynx habitat components	prey habitat, den habitat	Provide a mosaic of stand types including dense, young stands and mature, multi-storied stands that have the capability to provide dense horizontal cover.	no	Interagency Lynx Biology Team 2013
seclusion	motorized access	open route miles & densities, drivable route miles & densities	yes	Research: Rowland et al. 2005, Trombulak and Frissell 2000
seclusion	secure habitat	acres further than 500 meters from open and restricted-use roads	yes	USDI et al. 1986, USDI 1993

4.0 Pre-field and Field Review

We reviewed wildlife sighting records from the project area and vicinity in the geographic information system (GIS) databases managed by the Washington Department of Fish and Wildlife (WDFW), the Washington Department of Natural Resources Natural Heritage Program, and the CNF. We reviewed environmental assessments of past CNF projects completed in the area. We reviewed documentation of past species-specific wildlife surveys completed in the area.

Over the course of two field seasons, we conducted walk-through stand exams to assess habitats for lynx and other wildlife in the project area. During the northern goshawk nesting season, we surveyed for this species using broadcast, taped calls based on protocol in Woodbridge and Hargis (2006). We conducted specific searches for goshawk nests in suitable appearing habitat. We used bait stations with remote cameras to detect the presence of rare forest carnivores. Lastly, we used formal stand exam data, LiDAR imagery, aerial photo interpretation, and existing GIS layers to map potential habitats for individual species. Appendix C of this report provides a log of wildlife resource surveys completed for this project.

5.0 Incomplete and Unavailable Information

5.1 Wildlife Population Estimates

Accurate estimates of wildlife populations relative to the project area would be difficult if not unfeasible to obtain. It is unlikely that all activity centers such as dens or nests have been found. This is due to the limitations of detection methods and the level of effort and time that would be required for a complete census. Some species occur at very low densities and have vast home ranges (e.g., wolverine), making them very difficult to detect. A species' home range may only partially overlap the project area or may shift into or out of the project area over time.

Incidental wildlife observations and those recorded during species-specific surveys are records of presence at a given point in time. We may be able to surmise which local habitats are important to the species based on where and how often the animals were detected. If a wildlife activity center (such as a raptor nest) were found during project preparation, we would protect the site(s) as needed by adjusting the boundaries of treatment units, and / or including project timing restrictions in the area, as appropriate.

Although our knowledge of species presence and density is imperfect, we must still ensure that vegetation management activities in the project area do not directly, indirectly, or cumulatively impact the viability of wildlife species across the forest. To accomplish this, we must follow management guidance in recovery plans (e.g., grizzly bears) and conservation assessments (e.g., lynx). These documents are compiled by the taxon experts who are responsible for the conservation and recovery of the species. We must also ensure that the project incorporates Forest Plan management direction for wildlife, and current management recommendations in Gaines et al. (2017), and Mellen-McLean et al. (2013) for maintaining species viability. These resources provide an assessment of "source" habitat levels at the regional and forest-wide scales. They identify threats to the species, and conservation strategies.

Species listed as game animals in Washington State (e.g., big game, forest grouse, furbearers) are monitored by biologists with the Washington Department of Fish and Wildlife (WDFW) through the collection of annual trend count and harvest data, and on-going research. WDFW uses these data to manage for healthy, productive populations of game species at sustainable harvest levels. This monitoring and adaptive management further ensures that these species will persist on the forest over time.

5.2 Road Closure Effectiveness

Brushed out roads and new roads built with this project would be closed to motorized travel by the public. Not all road closures are effective and some of these closed roads could be breached. This could lead to an overall decrease in seclusion habitat available to wildlife in the project area, and an increase in game harvest levels, both legal and otherwise. It is difficult to accurately predict beforehand which, if any, road closures could be breached. This analysis assumes we would achieve a high degree of closure effectiveness in the project area based on the following:

- Temporary roads and roads selected for decommissioning are intended to be made un-drivable after use and no longer function as a road. The roadbed could be ripped or put back to slope in certain locations. The road entrance may be closed with piled logs, boulders, and other native materials and planted with native shrubs and trees. We have rarely documented breaches on roads which have been thus "put to bed" and none have had sustained motorized use.
- Other roads proposed for closure would be blocked with earthen berms, boulders, or other native materials installed on the road entrance. The road template behind the closure would remain intact and could be re-opened for future forest management. Such closures tend to be more effective than gates and are better accepted by the public.
- The Forest Service would monitor road closures for five years. If a breach was detected during that time, we would take steps to re-work the closure. We would continue to periodically monitor and improve the closure as necessary.

6.0 Threatened and Endangered (T&E) Species

6.1 Regulatory Framework

Section 7 of the Endangered Species Act of 1973 (ESA) requires all federal agencies, in consultation with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), to insure that their actions are not likely to jeopardize the continued existence of listed threatened, endangered or proposed species, or adversely modify their habitat. A biological evaluation / assessment (BE / BA) must be completed for all Forest Service planned, funded, executed, or permitted programs and activities to determine their possible effects to species listed under the ESA. The BE / BA should include a risk assessment of the potential effects of the project to each T&E species according to procedures outlined in Forest Service Manual (FSM) 2672.42, 8 / 90, R-6 Supp. 2600-90-5 (see Appendix A).

Current standards, guidelines, and recommendations for managing T&E species on the Colville National Forest can be found in the following documents:

- CNF Land Management Plan (USDA 2019),
- Endangered Species Act of 1973 (ESA),
- Forest Service Manual and Handbooks (FSM/H 2670/2609),
- Migratory Bird Treaty Act of 1918 (MBTA),
- Migratory Birds Executive Order (EO) 12962 of January 10, 2001
- National Environmental Policy Act of 1970 (NEPA),
- National Forest Management Act of 1974 (NFMA),
- Recovery plans, conservation assessments, and other species specific documents,
- Regional Forester policy and management direction.

The Sweet-Ione Project Area is entirely included within the boundaries of Pend Oreille and Stevens Counties, Washington. For these counties, the USDI Fish and Wildlife Service (FWS) presently lists five species as threatened or endangered under the Endangered Species Act (ESA) of 1973 (http: / / www.fws.gov / wafwo / species_new.html). Whitebark pine and monarch butterfly are presently candidate species for listing under the ESA. The following table displays information for the listed and candidate species relative to the project area. This report will address those terrestrial wildlife species that have been documented in the project area, or for whom potential habitat exists in the area. Project effects to T&E fish and plant species will be addressed in separate reports.

Table 10. Threatened (T), endangered (E), proposed (P) and candidate (C) species listed for the CNF (species in shaded blocks are addressed in this report).

Species	Status	Habitat present?	Documented in the area?	Habitat description / other comments
bull trout (*Salvelinus confluentus*)	T	Yes	Yes	Effects to this species covered under the fish biologist's report for the project.
Canada lynx (*Lynx canadensis*)	T	Yes	No	A portion of the project area overlaps the mapped range of lynx. In northeast Washington, lynx occupy higher elevation forests (above 4,100 feet). Snowshoe hares are the primary prey of lynx. Hares require low, concealing cover such as that provided by dense, young stands of lodgepole pine, other conifers, or mixed conifer / hardwood stands. Mature timber stands with dense understories are also used. Other considerations for lynx include habitat connectivity and seclusion from human disturbance (Ruediger et al. 2000, Interagency Lynx Biology Team 2013).
grizzly bear (*Ursus arctos*)	T	Yes	Yes	The project area is located west of the Pend Oreille River and more than 3.0 miles from the Selkirk Mountains Grizzly Bear Recovery Zone. However, the watersheds the project overlaps have been identified by the USDI Fish and Wildlife Service (2020) as areas where "bears may be present" based on recent occurrences. Spring foraging habitats for grizzlies include low to mid-elevation riparian areas, meadows, parklands, etc. Summer / fall foraging sites include mid-high elevation, berry producing shrub fields, montane meadows, and riparian areas. Grizzlies often den in alpine or subalpine areas with deep soils. Seclusion from human disturbance is a primary management objective (USDI et al. 1986, USDI 1993).
monarch butterfly *(Danaus plexippus plexippus)*	C	Yes	No	Breeding habitats for western monarch populations feature native milkweeds to provide food for larvae and other flowers to provide nectar for adults. Milkweeds have not been documented in the Sweet-Ione Project Area. Trees or shrubs provide shading and roosting, and habitat connectivity (The Xerces Society 2018). Migration routes are often along major rivers. Western monarch populations over-winter in coastal areas of California.
whitebark pine *(Pinus albicaulus)*	C	Yes	No	Effects to this species are covered under the botanist's report for this project.
woodland caribou (*Rangifer*	E	No	No	Woodland caribou inhabit mature montane forests of western redcedar / western hemlock, and subalpine fir / Engelmann spruce above 4,000 feet in elevation (USDI 1994, USDA

Species	Status	Habitat present?	Documented in the area?	Habitat description / other comments
tarandus caribou)				2019). The project area is located west of the Pend Oreille River and more than 6 miles outside of the Selkirk Mountains Woodland Caribou Recovery Area. The project area is outside the range of this (now extirpated) caribou herd.
yellow-billed cuckoo *(Coccyzus americanis)*	T	No	No	This species requires river floodplains that support dense willow and cottonwood stands (USDI 2017). This habitat does not occur in the project area.

6.2 Canada Lynx (threatened)

6.2.1 Regulatory Framework

In 2020, the CNF re-mapped lynx range across the Forest based on the findings of a recent vegetation type mapping contract (Borysewicz 2020). The USDI Fish and Wildlife Service reviewed the supporting documentation for this re-mapping effort and concurred with the proposed lynx range map revision (USDI 2020).

The Lynx Conservation Assessment and Strategy (LCAS, Interagency Lynx Biology Team 2013) identified the Selkirk Mountain Range as a "secondary area" for lynx. In secondary areas "The focus of management is on providing a mosaic of forest structure to support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area." Habitat management direction for lynx secondary areas identified in the 2013 LCAS was incorporated in the following Forest Plan desired conditions.

Forest Plan Desired Conditions

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species (page 59)

Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (per FW-DC-VEG-03 and table 5) and contribute to the recovery of federally listed threatened and endangered species.

FW-DC-WL-04. Habitat Components for Canada Lynx (page 59)

Forest Successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel, and denning components) with landscape pattern that is consistent with the historic range of variability (per FW-DC-Veg-03 and table 5).

6.2.2 Existing Conditions

A discrete area of secondary lynx range runs from the U. S. - Canada border to about 2.6 miles south of Baldy Mountain. This area covers approximately 23,341 acres (36.5 square miles), including approximately 931 acres of the Sweet-Ione Project Area. There are no known active or historic lynx den sites in this area. The last confirmed lynx detection in Pend Oreille County was in 2008 (Lewis 2016). A 2008 snowmobile track survey of the project area conducted by Washington Department of Fish and Wildlife biologists did not detect any lynx sign (Base and Loggers 2008). In the 2018 and 2019 field seasons, we installed scent lure stations with remote cameras at eight separate locations in the project area, to survey for rare forest

carnivores. This effort detected cougar, coyote, bobcat, black bear, elk, moose, white-tailed deer, snowshoe hare, and striped skunk, but no lynx or other rare carnivores.

Lynx Habitat Components

Within the 36.5 square mile area of secondary lynx range described above, we mapped potential lynx habitat components using data collected from stand exams, LiDAR imagery of tree heights and canopy closure, the forest's recently completed GIS layer of vegetation types, and aerial photo interpretation. Due to the inaccessibility of much of the area, actual ground-truthing outside the Sweet-Ione Project Area was limited. Table 11 displays the approximate acreages of the various habitat components within this mapped lynx range area.

Table 11. **Potential habitat within the mapped lynx range area (23,341 total acres)**

Habitat Component	Description	Approx. Acres (%)
den habitat	spruce - subalpine fir stands or mixed forests of spruce and birch with ample overhead canopy and concentrations of large woody debris	1,342 (6)
prey habitat	dense, young (15-30 years old) stands or plantations with ample low cover and forage plants for snowshoe hares	276 (1)
alternate prey habitat	multi-story stands that may provide habitat for red squirrels, grouse, and hares	3,679 (16)
"matrix"	immature stands that have ample concealing cover for a dispersing lynx, and that may have some local forage values	16,209 (69)
unsuitable habitat	recently created openings (1-10 years) that lynx may be reluctant to cross until concealing cover is restored	352 (1.5)
non-lynx habitat	Dry vegetation types and permanent openings such as rock features, montane meadows, powerline corridors, open water	1,483 (6)

Habitat Connectivity - Natural connectivity of habitat through and between areas of lynx range should be maintained across the landscape. Forested travel corridors along riparian zones, ridges, and saddles are likely important to lynx. It is desirable for foraging habitat to be continually available in proximity to denning habitat (Ruediger et al. 2000, Interagency Lynx Biology Team 2013).

Figure 8. Lynx habitat components

Unsuitable Habitat: recently created openings

Forage Habitat: dense plantations or older timber stands with dense understories

Den Habitat: Mature subalpine fir / Engelmann spruce stands with complex log jackpots / root wads (potential den sites)

Non-Lynx Habitat: dry forest stand

Non-Lynx Habitat: permanent opening

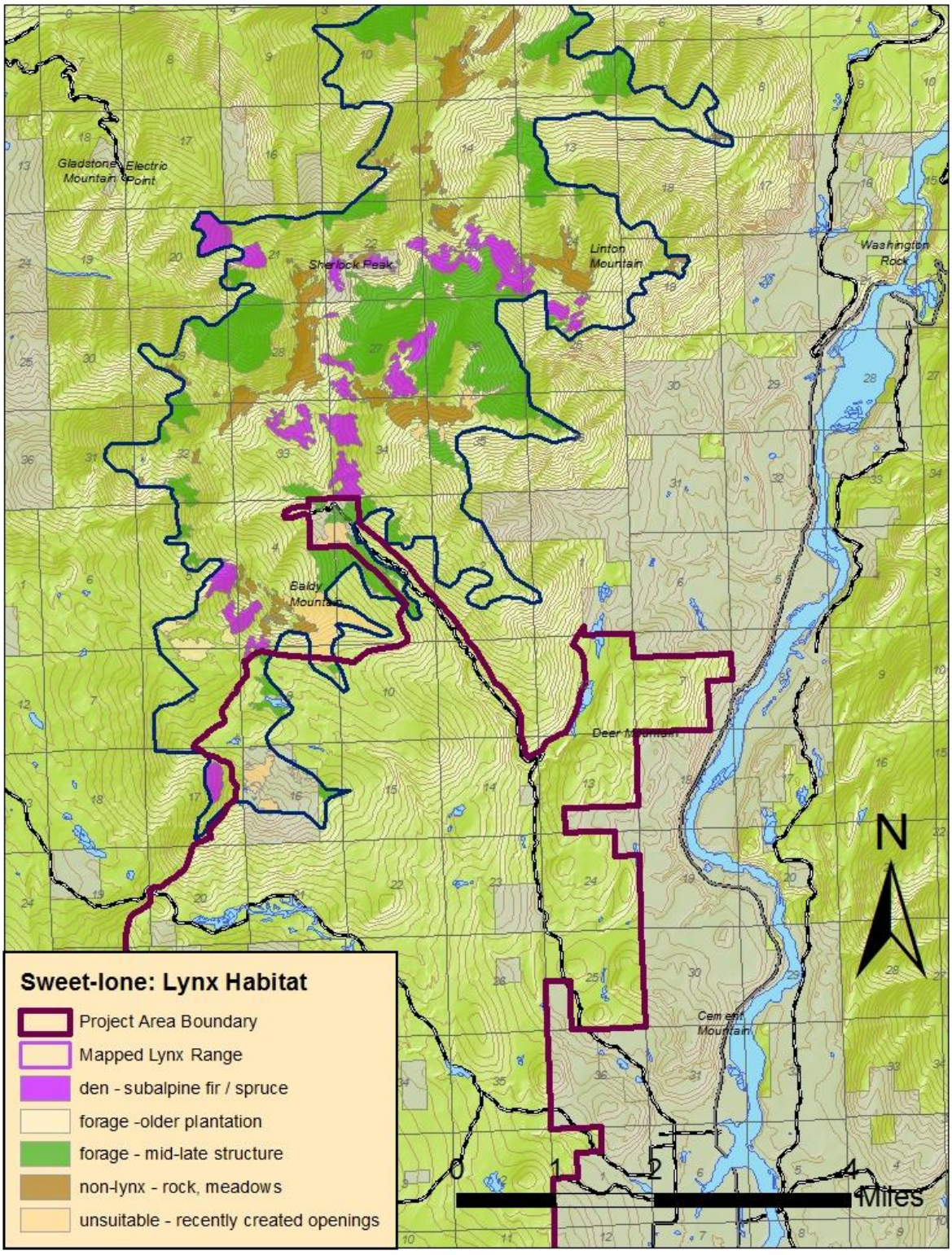

Figure 9. Mapped secondary lynx range overlapping the Sweet-Ione Project Area.

Forest Roads and Trails - Lynx have been known to use roads as travel-ways where there is adequate cover on both sides of the road. Herbaceous plants and shrubs that grow along road edges can attract hares. It is possible that lynx hunting near roads could be more susceptible to predation or human-caused mortality. However, "at this time, there is no compelling evidence to recommend management of road density to conserve lynx" (Ruediger et al. 2000). The 2013 LCAS does not recommend a target for road density on mapped lynx range.

Open road densities in the mapped secondary lynx range which overlaps the project area are quite low, as displayed in Table 12.

Table 12. Mapped secondary lynx range (36.5 square miles); motorized route data.

Motorized Route Type	**Lynx Range Existing miles (mi. /sq. mile)**
Winter Route Type	
plowed roads	0
groomed for snowmobiles	0
not groomed, but designated for snowmobile use (Frisco Standard Road: FR 6270)	0.8
Total snowmobile routes	0.8 (.02)
Non-winter Route Type	**miles (mi. /sq. mile)**
open roads	4 (0.1)
restricted (gated) roads	7.5 (0.2)
motorized trails	0
Total drivable summer routes	7.9 (0.3)

6.2.3 Environmental Consequences

6.2.3.1 Direct and Indirect Effects of No Action

Forest Habitats – Within about 10 - 15 years, many of the dense plantations that are presently providing quality habitat for snowshoe hares on the lynx range could grow out of suitable condition. Other, more recently created plantations could replace this habitat as the young trees on these sites grow to form a dense, low canopy.

With continued fire suppression, forest fuels would build up incrementally on the lynx range over time. Stand understories would become more inter-connected with the overstory trees. There would be a corresponding increase in the risk of large, stand-replacing wildfires occurring in the area. Such fires could result in the wholesale removal of potential den stands and prey habitats. Forest succession would be re-initiated within the burned areas, setting the stage for the eventual recruitment of dense, younger stands utilized by snowshoe hares. The interiors of large, intensively burned patches may take many years to reforest naturally, if there is a lack of nearby seed sources.

Habitat Connectivity - Presently, lynx should be able to easily move / disperse through the mapped lynx range that overlaps the project area, as well as to other discrete areas of lynx habitat. This would continue to

be the case unless a large wildfire or other catastrophic event removes forest cover over large swaths of the area.

Forest Roads and Trails - There would be no change to the existing open motorized route densities on the mapped lynx range. There would be no additional routes designated for snowmobiles on the lynx range.

6.2.3.2 Direct and Indirect Effects of the Proposed Action

Shelterwood harvest (Unit 1) would create an opening on approximately 87 acres of the mapped lynx range. A mixed harvest prescription (Units 2 and 3) would occur on approximately 211 acres of lynx range; of which 60 percent of the acres harvested (127 acres) could be created openings. Commercial thinning (Unit 6) would occur on approximately 30 acres of lynx range.

The following table displays the short-term effects the Proposed Action would have to the mapped habitat components for lynx.

Table 13. Comparison of lynx habitat levels between the existing condition and the proposed action
(all values are approximate)

Resource Indicator	Existing	Proposed Action
lynx prey habitat		
- dense, young (15-30 years old) forest	276	276
- multi-story forest	3,679	3,607
den habitat		
- mature spruce / fir with ample overhead cover and large woody debris	1,342	1,342
unsuitable habitat	352	566
- recently created openings that lynx would be reluctant to cross		

Den Habitat - No mapped potential lynx den stands would be harvested. Project related activities on the high-elevation lynx range should only occur late in the denning season, due to the cost of plowing snow and road use restrictions to protect soft roadbeds in the spring. In the unlikely event project activities occurred near an active den, a lynx mother should be able to relocate her young away from the area, if necessary.

Prey Habitat: Dense Young Forest - Vegetation management would not occur within older plantations on the lynx range that we mapped as potentially suitable habitat for snowshoe hares. Many of these plantations would likely grow out of suitable condition in about 10-15 years.

Timber harvest would create openings on up to 214 acres of the lynx range. These openings would be planted with trees, and we would expect some in-fill by trees that seed in naturally. Within about 20 years, growing young trees in these areas could become dense enough to provide good habitat for snowshoe hares.

Prey Habitat: Multi-story Stands – No live trees that are 20+ inches in diameter would be designated for harvest, except those that might exist within new road or equipment corridors, and landings. Because these mature trees tend to be the most prolific cone producers, they are important to red squirrels, an alternate lynx prey animal. Some discrete, multi-story patches of trees would be included within Units 2, 3 and 6. To the extent possible, these stand patches would be reserved from harvest as unmanaged "skips."

Unsuitable Habitat - Timber harvest would create openings on up to 214 acres of stands in middle structural stages on the mapped lynx range. Lynx could be reluctant to cross these openings due to the lack of concealing cover; particularly in the winter (Interagency Lynx Biology Team 2013). These potential effects

could last for 5-10 years, until growing conifers and other vegetation can re-establish hiding cover. In some locations, openings created by timber harvest would be broken up by patches of thinned trees, as well as unharvested "skips." These islands of cover could be exploited by dispersing lynx. We would also leave intact cover patches on the major ridge that makes up the western boundary of Unit 1, to facilitate movement along the ridge (see the Project Design Elements, earlier in this report).

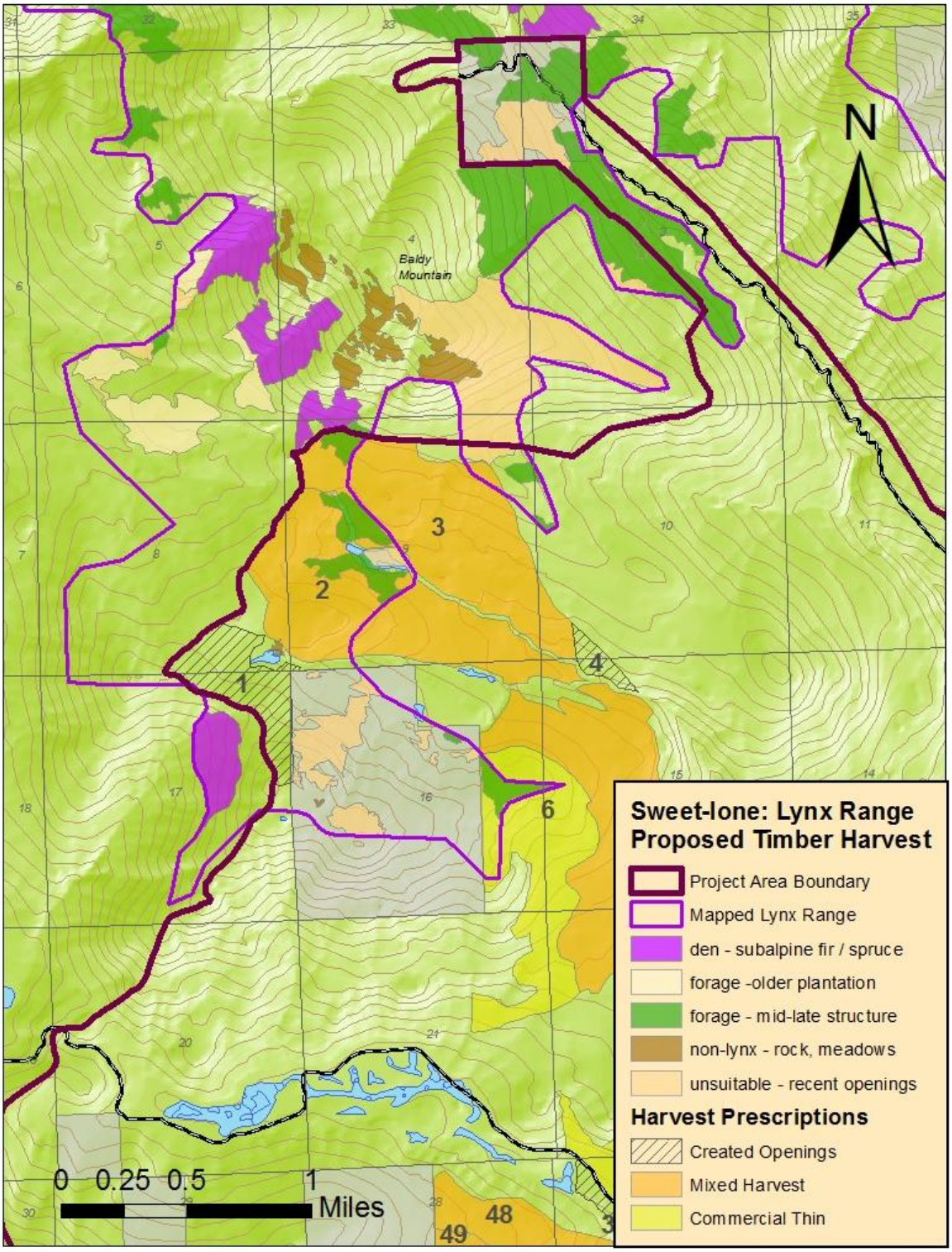

Figure 10. Proposed timber harvest on the mapped lynx range.

Forest Roads and Trails – No new roads or motorized trails would be constructed on the mapped lynx range. The miles of open snowmobile routes on the lynx range would not change from the present condition.

6.2.4 Cumulative Effects of the Proposed Action

The cumulative effects area is the 36.5 square mile mapped secondary area for lynx, which runs from the U.S. - Canadian border to the northwest corner of the Sweet-Ione Project Area.

Timber sales associated with the Limestone Vegetation Management Project Environmental Assessment (USDA 2017) are presently active on NFS lands in northern half of the cumulative effects area. As with the Sweet-Ione project, the Limestone project would not affect any mapped potential den habitat. None of the sales would affect any older plantations on the lynx range that could be providing habitat for snowshoe hares. All sales would create openings in some stands in middle structural stages on the lynx range. These openings are likely to be avoided by lynx over the short term, until concealing cover is re-established by growing conifers and other vegetation. Within about 20 years, these sites could become dense enough to provide some higher quality snowshoe hare habitat. All projects would promote a mosaic of forest structure that includes dense, early successional stands, and a component of multi-story conifer stands, on the lynx range. Neither project would compromise habitat connectivity for lynx. There would be no change to open road densities or designated over-the-snow vehicle routes on the lynx range. No other vegetation management projects are active or proposed on NFS lands in the area.

The cumulative effects area includes approximately 622 acres of WA Department of Natural Resources (DNR) land east of Abercrombie Mountain. Since this parcel is entirely within the Abercrombie-Hooknose Roadless Area and has little commercial timber value, it will remain unmanaged. There are approximately 654 acres of private lands in the mapped lynx range. Some level of forest management has occurred on portions of these isolated parcels in the past. Plans for future vegetation management on these lands are unknown.

The noise of heavy equipment / motorized vehicle operation, and the presence of humans associated with the Sweet-Ione project could disturb resident or dispersing lynx. These effects could be cumulative to those disturbances resulting from the Limestone project, as well as forest recreation and the other activities characterized in Appendix B of this report. We expect these effects would be mostly limited to the summer months, and to local, discrete portions of the lynx range (e.g., active harvest units and open roads). Individual lynx should be able to easily displace from areas of on-going activity to other more secluded portions of the lynx range, if necessary.

6.2.5 Effects Determination

If the proposed action did not occur, baseline habitat conditions for lynx would likely be maintained over the short-term, since forest management would not be initiated within the mapped lynx range. In plantations that are presently providing good quality habitat for snowshoe hares, the live canopy would gradually lift off the ground as the trees grow and their lower branches die from lack of sunlight. As a result, these plantations would no longer provide suitable habitat for hares in about 10 - 15 years.

The Proposed Action would have no effect on potential den habitat for lynx. Regeneration harvest would create openings over about 214 acres of the mapped lynx range. Lynx would tend to avoid these openings for 5-10 years, until concealing cover is restored by growing trees and other vegetation. In about 20 years these sites could become dense enough to provide quality snowshoe hare habitat. The Proposed Action would maintain a mosaic of dense, young age class stands, and multi-storied stands on the lynx range, as recommended by the 2013 Lynx Conservation Assessment and Strategy. We would ensure that habitat

connectivity would be maintained. Based on these considerations, the proposed action may affect, but is not likely to adversely affect lynx.

Risk Analysis

Likelihood of adverse effects = low

Consequence of adverse effects = moderate

Risk index value = 1 x 5 = 5

Project may proceed after informal consultation with and concurrence by the USDI Fish & Wildlife Service.

6.3 Grizzly Bear (threatened)

6.3.1 Regulatory Framework

The Interagency Grizzly Bear Guidelines (USDI et al. 1986), the Grizzly Bear Recovery Plan (USDI 1993), and the Forest Plan (USDA 2019), provide direction for managing habitat for grizzly bears. The Grizzly Bear Recovery Plan identifies six individual recovery zones for grizzlies in the western United States. The Selkirk Mountains Grizzly Bear Recovery Zone includes a portion of the CNF located east of the Pend Oreille River and north of the Mill Creek drainage. The Sweet-Ione Project Area lies west of the river but is within watersheds identified by the USDI Fish and Wildlife Service (2020) as areas where grizzlies "may be present," based on recent occurrences. Within these areas, we assess project-level effects related to road densities and "secure habitat," defined as areas lying further than 500 meters from open and restricted access (gated) roads.

6.3.1.1 Forest Plan Desired Conditions, Standards, and Guidelines

Forest Plan direction specific to grizzly habitat management is mainly applicable to the recovery zone. The following general direction for vegetation management can provide a benefit to bears outside the recovery zone.

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species (page 59)
Provide habitat conditions (amount, distribution, and connectivity of habitat) consistent with the historical range of variability and contribute to the recovery of federally listed threatened and endangered species

FW-GDL-WL-01. Hiding Cover for Wildlife (page 64)

Where the opportunity exists, retain hiding cover along open roads adjacent to created openings

FW-GDL-WL-03. Unique Habitats (page 64)

Maintain or protect unique habitats from activities that result in habitat loss or disturbance. Unique or uncommon habitats used by grizzly bears include wetlands, deciduous forest, meadows, forb fields, avalanche chutes, and berry-producing shrub fields.

6.3.2 Existing Conditions

In recent years, radio-collared grizzly bears have on occasion spent time in the Sweet-Ione Project Area before crossing back to the east side of the Pend Oreille River.

Grizzly Bear Habitat Components

Forage Resources - Diets of grizzly bears change with the seasons as different food sources become available (USDI 1993). Grasses, sedges, and succulent forbs provide important spring forage for grizzly bears. These plants are present in riparian corridors along major stream courses, wetlands, and within the power

transmission corridor in the eastern portion of the project area. Green forage is also available within openings recently created by timber harvest, and within a few small, historic homestead meadows in the lower elevations. Grizzly bear use of many of these habitats may be limited by the presence of adjacent open roads.

Berry-producing shrubs are important late summer / fall foraging resources for bears. The project area contains a few discrete, open shrub fields, but these tend to be drier and lacking in berry-producing shrubs. Many of the timber stands in the project area are quite dense and lacking a well-developed shrub layer. Some of the more open stands support shrub understories which include huckleberries and other berry-producing shrubs in varying amounts. Rotting tree stumps and large down logs that provide bears with ants, grubs, and other insects are uncommon to rare in the project area. Bears may have access to an occasional carcass of a winter-killed ungulate in the area. They could also opportunistically prey on big game calves and fawns in the spring and early summer.

Hiding Cover - Hiding cover for grizzly bears is defined as vegetation capable of hiding 90 percent of a bear at 200 feet (USDA et al. 1990). This habitat component is most important along open roads. The project area is characterized by dense, mostly continuous forest cover. The great majority of forest stands in the area are presently providing hiding cover.

Den Sites - Grizzlies usually excavate dens on steep slopes where wind and topography cause snow to accumulate and persist late into the spring. Den sites are generally selected at higher elevations and isolated from development and human activity (USDI 1993). Limited areas on the ridge that makes up the western edge of the project area could potentially provide den habitat. However, the best potential habitat by far is along the high-elevation ridge systems of the Abercrombie-Hooknose Roadless Area, north of the project area. Active grizzly bear dens have not been documented on the CNF outside of the Selkirk Mountains Grizzly Bear Recovery Zone.

Secure Habitat –The USDI Fish and Wildlife Service (2020) identifies the Sweet Creek and Big Muddy Creek Watersheds as areas where grizzly bears may be present based on recent occurrences. Lands in these watersheds which lie further than 500 meters from open and restricted roads and motorized trails are classified as "secure habitat." Within the 500-meter road corridor, grizzly bears are most prone to being disturbed and displaced from suitable habitat by encounters with vehicle traffic or people on foot. The risk of a bear being mistakenly shot by a black bear hunter, or by a poacher, is higher near drivable roads. The higher the road density is in an area, the fewer acres of secure habitat and the greater the risk of human-caused bear mortality. The following table displays the existing road density and secure habitat levels in the project area.

Table 14. Seclusion habitat indicators and measures for the existing condition
(Project area = 31.9 square miles)

Resource Element	**Resource Indicator**	**Measure (Quantify if possible)**	**Existing Condition**
seclusion	motorized access	Open route miles Open route density Drivable (open and restricted) route miles Drivable route density	84 miles 2.63 miles / square mile 109.9 miles 3.45 miles / square mile
seclusion	secure habitat	Acres further than 500 meters from open and restricted roads	2,785 acres

As displayed in the Table 14, motorized route densities in the Sweet-Ione Project Area are presently high. Correspondingly, secure habitat levels are low. There is no direction to manage for specific levels of these habitat parameters outside of grizzly bear recovery zones. However, within identified "bears may be present" watersheds, we use these metrics to assess project-related effects to grizzly bears.

6.3.3 Environmental Consequences

6.3.3.1 Direct and Indirect Effects of No Action

Forage Resources - Green forage plants would be available to bears for the foreseeable future within permanent openings such homestead meadows and powerline corridors, as well as within wetlands and streamside riparian areas. In many cases, the ability of bears to make full use of these sites would continue to be impacted by the presence of nearby open roads. Openings recently created through timber harvest would also provide some foraging opportunities, until the canopies of young trees begin to abrade. Modest berry crops would continue to be available in the more open forest stands so long as adequate sunlight reaches the stand understories.

Ground and ladder fuels would continue to accumulate in the project area over time. The potential for a wildfire to ascend into the overstory trees and remove entire patches of forest would increase correspondingly. Upland shrubs, grasses, and forbs could be killed outright in the hottest portions of such a fire. Where their root systems have not been overheated, these plants should respond with profuse sprouting of vigorous new shoots. A few years following a wildfire, there could be a dramatic increase in green forage production and palatability in the burned area. There would be a lag in fruit production until berry-producing shrubs can fully recover in perhaps 3-7 years (Coates and Haeussler 1986).

Burns of high intensity are the most likely to provide good growing conditions for noxious weeds. With high intensity fires there would be more overhead canopy removed resulting in higher light levels, and more forest duff consumed, exposing soils. There would be less living vegetation for newly established weeds to compete with for sunlight, water, and soil nutrients. In areas of heavy weed infestation, existing native plants could be replaced, including those that are palatable to bears.

Hiding Cover - Horizontal cover should remain abundant across the project area for at least the near-term. With increasing fuel loads, the potential for a large, hot fire to occur in the area would increase over time. In such an event, hiding cover would be removed in areas of high-intensity burns and degraded in mixed or low-severity burn areas. Bears moving through a large, recently burned area could be more vulnerable to human-caused disturbance or mortality, particularly near open roads.

Den Habitat - There would be no effects to potential den habitat since no new forest management activities would be initiated in the project area.

Seclusion - There would be no change in open or drivable route densities, or the availability of secure habitat in the project area, from the present condition.

6.3.3.2 Direct and Indirect Effects of the Proposed Action

Forage Resources – Proposed timber harvest would reduce the overhead tree canopy in many forest stands. Where they exist in the areas proposed for harvest, forage plants utilized by bears could benefit from the increase in available sunlight, and the reduction in competition for water and soil nutrients. Grasses and other green forage plants could quickly become more palatable and productive. Berry crops could be enhanced over time. These potential effects would likely be best realized where timber harvest creates openings. Shelterwood harvest would create approximately 1,240 acres of openings in the forest canopy. The mixed harvest prescription would create approximately 1,881 acres of openings.

The Proposed Action would employ low intensity burns to reduce forest fuel loads both within and outside of harvest units. Treated areas would either be mostly blackened, or a mosaic of burned and un-burned sites, relative to the amount of surface fuels present (personal comm. with B. Zoodsma 2015). Prescribed fires would thin out dense areas of conifer regeneration and consume litter and down wood on the forest floor. The above-ground portions of forage plants eaten by bears could be consumed. However, a "pulse" of nutrients would be released into the soil from the ash of consumed vegetation and dead material. Green forage plants should quickly respond with profuse sprouting of nutritious and palatable shoots from their intact root systems. The quality and productivity of green forage plants should be improved for perhaps 5 - 10 years following burning. It would take perhaps 3-7 years for berry-producing shrubs to re-gain their pre-fire coverage (Coates and Haeussler 1986). Over the longer term, fruit production could be enhanced in burned areas.

Timber harvest and fuels treatments could expose soils and provide opportunities for the expansion of noxious weed infestations. New roads and equipment corridors could provide pathways for the spread of noxious weed seeds. If weeds become locally established due to this project, they could out-compete existing bear forage plants, particularly native grass plants and forbs.

Several factors should minimize the potential for noxious weed populations to spread within the project area. Prescribed burns would be completed during optimum weather and fuel moisture conditions to ensure low-intensity fire behavior. Thus, most of the forest duff should be maintained and very little soil should be exposed in burned areas. New roads would not be opened to the public. The project would incorporate routine weed control measures such as seeding exposed soils at log landings, skid trails and burn piles. Herbicides would be sprayed on roadside weed infestations prior to the start of the project. In addition, the Forest Service would continue to use herbicides to combat weed infestations in meadows, power line corridors, and other openings.

Hiding Cover - Hiding cover would be removed over the short term (approximately 5-10 years) within openings created by timber harvest. Where the opportunity exists, strips or clumps of trees and shrubs would be maintained along open roads located adjacent to created openings. The intent would be to limit line-of-sight distances from the road into the harvested unit. Within areas proposed for commercial thinning, hiding cover would be degraded in direct relation to the basal area of the residual trees, and the pre-harvest amount of understory plants.

Prescribed burning should have minor and mostly short-lived (1-3 years) impacts to hiding cover. Within areas proposed for under-burning there would likely be unburned "fire skips", owing to discontinuous fuel concentrations at the stand level. Even in areas that are well-blackened, some degree of horizontal cover would be provided by the skeletons of shrubs and young trees, partially burned logs, and tree boles. Upland shrubs, grasses, and forbs would quickly re-sprout from their root systems and regain much of their above-ground biomass in one to a few growing seasons.

Potential Den Habitat – By far the best potential den habitat in the Sweet and Big Muddy Creek Watersheds is along the major ridge systems of the Abercrombie-Hooknose Roadless Area, well-removed from the project area. Winter project activities would be unlikely to occur in the higher elevation units, due to the cost of plowing snow to those sites. Based on this, and the lower suitability of the project area for denning, the risk of disturbance to bears in an active den would be remote.

Seclusion - The level of human disturbance in the project area would increase for the duration of the project. Bears would likely avoid areas of ongoing activities; particularly where heavy equipment was operated. The normal timber sale operating season would begin on June 1 to protect soils and soft roadbeds. Thus, operations would be curtailed over most of the critical spring period for grizzly bears (April 1 - June 15).

Project activities would occur during daylight hours and would be localized to a subset of active harvest units and timber haul routes at any given time. Bears should be able to disperse away from areas of ongoing activity, to more secluded locations if necessary.

With the Proposed Action, the timber sale purchaser would construct up to eight miles of new temporary roads to access timber stands for management. A few presently brushed-in roads could be made drivable. For the duration of the project, motorized travel by the public on these roads would be prohibited with gates or other means. Following harvest activities on a given road, the road entrance would be blocked with root wads, boulders, or excavated earthen berms. All or portions of the road prism might be ripped. Dependent on the need, we would seed any exposed soils with grasses and forbs and plant shrubs and trees on the road entrance to create a vegetative screen. Based on our experience with such native material road closures, we should be able to achieve a high degree of closure effectiveness.

Several existing roads in the project area would be decommissioned to reduce impacts to riparian habitats and water quality in streams. These roads were typically not built in the best location and are not needed for future forest management. Certain other existing roads would be closed to public use by means of gates installed on their entrances. All unauthorized roads would be closed using native materials.

The following table displays the approximate miles of motorized routes in the Sweet-Ione Project Area, before, during and after the project. Secure habitat acres are also displayed.

Table 15. Comparison of grizzly bear habitat indicators and measures
(Project area = 31.9 square miles)

Resource Indicator	Measure (quantify if possible)	Existing condition	Proposed Action post-project
motorized access	Open route miles (density) Drivable route miles (density)	84 miles (2.63 mi / sq. mile) 109.9 miles (3.45 mi. / sq. mile)	71 miles (2.23 mi. / sq. mile) 96.9 miles (3.04 mi. / sq. mile)
secure habitat	Acres further than 500 meters from open and restricted roads	2,785 acres	3,937 acres

We do not presently propose further reductions in the drivable road miles in the Sweet-Ione Project Area for the following reasons:

- The Forest Service has no jurisdiction over state, county, or privately owned roads in the area.
- We must provide reasonable (i.e., road) access to private in-holdings per the Alaskan Native Interest Lands Conservation Act.
- The Bonneville Power Administration and Pend Oreille County Public Utility District #1 require road access to service power transmission line infrastructure and maintain power line corridors.
- The US Air Force Survival School desires continued open road access on specific roads.
- Some open road access is also needed / desired for forest recreation, special forest products collection (ex., firewood), and range allotment permit administration.

Post-project, the Forest Service would monitor closed roads in the area for five years. We would take any steps necessary to address breaches and improve the effectiveness of road closures.

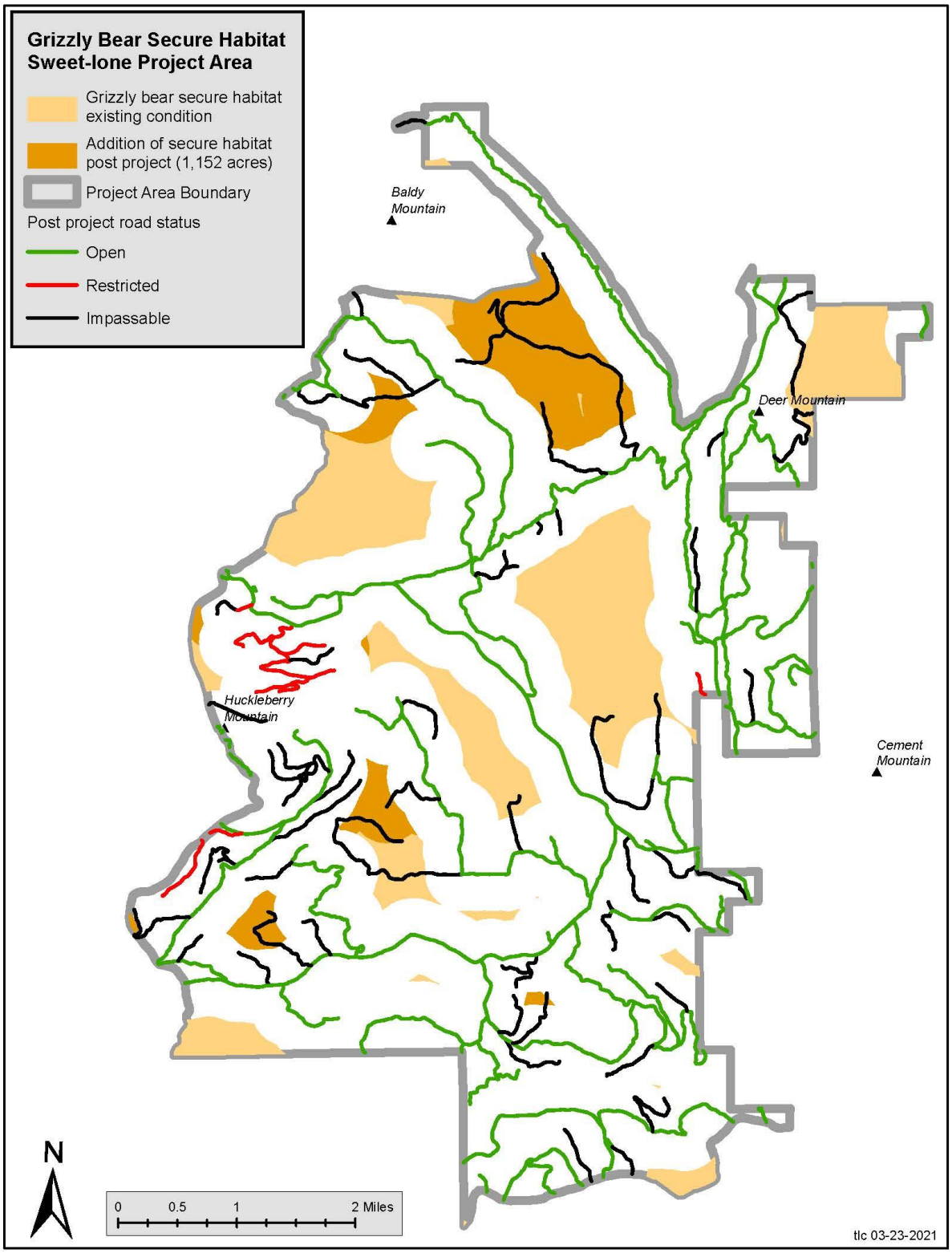

Figure 11. Secure habitat: existing and post-project.

6.3.4 Cumulative Effects of the Proposed Action

In grizzly bear recovery zones, biologists evaluate and monitor habitat over individual bear management units (BMUs). A BMU is roughly 100 square miles in size; the average area required to support an adult sow with cubs. The Sweet Creek - Pend Oreille River Watershed (both sides of the river) and the Big Muddy Creek Watershed together total about 93 square miles. Thus, these watersheds are an adequate area over which to assess cumulative effects to grizzly bears.

No other timber sales are currently active or are planned on NFS lands in the cumulative effects area. Known timber sales on state and private lands, and other ongoing uses and activities within the cumulative effects area are characterized in Appendix B.

Cumulative Effects to Hiding Cover – Timber sales on all ownerships in the cumulative effects area would reduce hiding cover by removing trees and other vegetation. On NFS lands, hiding cover would be retained along open roads to the extent feasible, per Forest Plan Guideline *FW-GDL-WL-01. Hiding Cover for Wildlife* (page 64). Forest succession would restore hiding cover in most harvested areas within 5-10 years. The landscape across the timbered portions of the cumulative effects area would be a mosaic of stands in different age classes and structural stages and should remain permeable to dispersing bears. Over time, additional forest stands on private lands in the Pend Oreille River Valley could be converted to livestock and residential uses, reducing forest cover in the river corridor.

Cumulative Effects to Forage - Active or proposed forest management projects would cumulatively improve foraging opportunities for bears by removing conifer cover and stimulating the growth of understory plants. These benefits would be best realized in areas of regeneration harvest (created openings) that are subsequently broadcast burned. However, even partial harvests (e.g., thinning) can improve growing conditions for any green forage and berry-producing shrubs present in the harvested unit.

The Sweet-Ione project could contribute to the spread of noxious weeds where soil is exposed by heavy equipment operation. These potential effects could be cumulative to those resulting from timber harvest, livestock grazing, dispersed recreation, and other activities on all land ownerships. To minimize the potential for noxious weed spread, the Forest Service would continue to seed exposed soils, improve the effectiveness of road closures, spray infested road shoulders with herbicides, etc. These actions have been very effective in reducing weed spread in many parts of the Forest. Active weed spraying programs will be necessary so long as vegetation management, grazing, and forest recreation continues. Noxious weeds could increase on private and state lands over time, due to varying levels of commitment and resources available for prevention, treatment, and monitoring on those ownerships.

Cumulative Effects to Seclusion – Disturbance effects from the Sweet-Ione Project Area could be cumulative to those attributed to any coincident forest management projects on other ownerships in the watersheds, as well as to the ongoing activities identified in Appendix B. However, disturbance resulting from the Sweet-Ione project would be limited to daylight hours during the normal operating season (June 1 - October 31). A small subset of the proposed harvest units and haul routes would likely be active at any given time. Road closures proposed with the project would result in a decrease in motorized route densities and an increase in secure habitat in the project area.

6.3.5 Effects Determination

The Sweet-Ione Project Area lies outside of the Selkirk Mountains Grizzly Bear Recovery Zone but within watersheds identified by the USDI Fish and Wildlife Service (2020) as places where "bears may be present."

If the Proposed Action did not occur, there would be no immediate effect to grizzly bears since forest management activities would not be initiated in the project area. Road densities and secure habitat levels

would remain unchanged. Over time there would be an increasing risk of stand-replacing fires occurring in the area. Such fires could remove large swaths of forest cover and burn over existing forage plants. Forage production could be stimulated in burned areas that could benefit bears over the short to mid-term. Bears could be more prone to human-caused mortality in large burn scars, due to a lack of concealing cover.

With the Proposed Action, timber harvest and prescribed burning would reduce conifer cover and improve growing conditions for forage plants utilized by bears. The noise and human presence associated with project activities could disturb a bear at a foraging or resting site, causing it to move to a more secluded area. These potential effects could be cumulative to those resulting from concurrent forest management projects on state and private lands, and to other ongoing uses / activities in the watersheds (see Appendix B). Open road miles would not be increased at any time by the Sweet-Ione Project. Road closures proposed with the project would decrease the open and drivable route densities and increase secure habitat from the present condition. Based on these considerations, the proposed action may affect, but is not likely to adversely affect grizzly bears.

Risk Analysis (see Appendix A)

Proposed Action

Likelihood of adverse effects = low

Consequence of adverse effects = moderate

Risk index value = 1 x 5 = 5

Project may proceed after informal consultation with and concurrence by the USDI Fish & Wildlife Service.

6.4 Summary of Environmental Effects to T&E and Candidate Species

The following table provides a summary of the project effects determinations for threatened, endangered, and candidate species and the rationale for each determination. The expected duration of effects would be as follows: short-term = 0-10 years; mid-term = 10-30 years; long term = 30+ years.

Table 16. Summary of project effects to threatened, endangered, and candidate species

Species	Determination	Rationale for determination
Canada lynx (T&E)	*No Action* may affect, not likely to adversely affect	Baseline habitat conditions likely maintained over at least the short term. With continued fire suppression, there would be an incremental increase in the risk of stand-replacing wildfires occurring in the project area over time. If such a fire overlapped the lynx range, it could create large swaths of unsuitable habitat and disrupt habitat connectivity over at least the short term. Natural forest succession in the burned area could set the stage for the eventual development of primary prey (snowshoe hare) habitat. However, the interiors of large burn scars could take long periods to reforest, owing to their distance from available seed sources. No change in road mileage or snowmobile routes on the lynx range.
Canada lynx (T&E)	*Proposed Action* may affect, not likely to adversely affect	The Proposed Action would reduce the risk of future high-intensity fires occurring on the lynx range through stand stocking control (commercial thinning) and the reduction of forest fuels (prescription burning and mechanical site prep.). No known lynx den sites on the forest. Potential den stands mapped in the

Species	Determination	Rationale for determination
		project area would be protected by avoidance. Timber harvest would create openings on approximately 214 acres of the lynx range. These areas would be avoided by lynx for 5-10 years, until growing trees and other vegetation can re-establish hiding cover. In 20+ years, young trees in these openings could grow sufficiently dense to provide suitable habitat conditions for snowshoe hares, indirectly benefitting lynx. Existing multi-story stand patches would be maintained in harvest units which overlap the lynx range. The Proposed Action would maintain a mosaic of dense young stand structure and multi-story stands on the lynx range. Habitat connectivity for lynx would be maintained. No change in road mileage or snowmobile routes on the lynx range. *Cumulative effects*: The cumulative effects area is the entire secondary lynx area centered around Abercrombie Mountain. Timber sales associated with the Limestone Environmental Assessment are presently active on NFS lands in this area. These sales would have similar and cumulative effects to lynx habitat as those reported for the Sweet-Ione project. Potential den habitat would be maintained by avoidance. Multi-storied stands would be maintained. All projects would be consistent with recommendations in the Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013), as well as with Forest Plan Desired Condition *FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* (page 59). No other vegetation projects are planned on NFS or state lands within the lynx range. Planned vegetation management on the small, isolated private parcels in the area is unknown.
grizzly bear (T&E)	*No Action* may affect, not likely to adversely affect	Baseline habitat conditions likely maintained over at least the short term. Where future wildfires burn with low to moderate intensity, understory plants could experience improved light levels and decreased competition for site resources. The growth and palatability of green forage plants could be enhanced over at least the short term. Fruit production on berry-producing shrubs could increase. With continued fire suppression, there would be an incremental increase in forest fuels and fuel connectivity across the project area. The potential for stand-replacing fires to occur in the area would increase accordingly. Such fires could greatly improve the growth and palatability of forage plants, except where soil productivity is compromised in the most intensively burned areas. Stand-replacing fires could remove forest cover over large acreages, potentially making a grizzly bear moving through the burn scar more vulnerable to human-caused disturbance and mortality. Road densities and secure habitat levels would not change.
grizzly bear (T&E)	*Proposed Action* may affect, not likely to adversely affect	The Sweet-Ione Project Area is outside of the Selkirk Mountains Grizzly Bear Recovery Zone but within watersheds where "bears may be present," as identified by the U. S. Fish and Wildlife Service (USDI 2020). Proposed forest management would result in a widespread reduction in stand densities, surface fuels, and fuel continuity. The risk of a high-severity fire removing forested cover over large areas should be reduced. Timber harvest and under-burning would likely improve the production / palatability of existing forage plants over the short to mid-term. The extent of these effects would likely

Species	Determination	Rationale for determination
		be most pronounced in created openings (e.g., shelterwood harvest units) that are subsequently underburned. Enough existing vegetation would be retained along open roads adjacent to created openings to maintain sight distances from the road into the unit, per Forest Plan Guideline *FW-GDL-WL-01. Hiding Cover for Wildlife* (page 64). Bears could be disturbed and displaced from areas of ongoing activities; particularly where heavy equipment is operated. These effects would be confined to a small subset of the proposed treatment units and access roads at any given time. New temporary roads, existing restricted roads, and roads brushed out for the project would be kept closed to public use. Post-project, drivable road densities would be reduced, and secure habitat would be increased by about 1,152 acres, due to proposed road closures. These actions would be consistent with Forest Plan Desired Condition *FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* (page 59). *Cumulative effects*: The cumulative effects area is the Sweet Creek - Pend Oreille River, and Big Muddy Creek Watersheds. No other timber sales would be concurrently active or are planned on NFS lands in this area. Timber sales on other ownerships would likely have similar beneficial effects to existing forage resources as the Sweet-Ione project. Concurrent timber sales on non-NFS lands and ongoing forest uses / activities identified in Appendix B could increase human disturbance in the cumulative effects area. However, disturbance resulting from the Sweet-Ione project would be confined in time and space and would be offset by the decrease in drivable road miles and increase in secure habitat that would be a direct result of road closures proposed with the Sweet-Ione project.
monarch butterfly (candidate)	*No Action* no affect	The Sweet-Ione Project Area is mostly forested, often with closed canopy stands. Flowering plants are not common in the area and tend to be most prevalent in the power transmission line corridors and on roadsides. Milkweed plants have not been documented in the area. Where future fires burn with low to moderate intensity, understory plants could have improved access to sunlight and decreased competition for site resources. The growth of flowering plants could be enhanced over at least the short term. With continued fire suppression, there would be incremental increases in forest fuels and fuel connectivity across the project area over time. The potential for stand-replacing fires to occur in the area would increase accordingly. Such fires could greatly improve the growth of flowering plants, except where soil productivity is impaired in the most intensively burned areas.
monarch butterfly (candidate)	*Proposed Action* may adversely impact individuals or habitat, but is not likely to result in	Adult and larval monarch butterflies could be directly killed by timber harvest, road construction, and prescribed burning operations. Animals could be more susceptible to predation in areas where concealing cover has been reduced. Nectar plants could be crushed by heavy equipment operation and removed where prescribed fire is employed. We have not documented milkweed plant species in the project area to date. Other nectar plants such as thistles, asters, sunflowers, and clovers appear to be very locally distributed within the powerline corridors, and on disturbed sites

Species	Determination	Rationale for determination
	jeopardy	such as roadsides. These sun-loving plants are rare to nonexistent within most forest stands proposed for management, due to shading from the overhead tree canopies. Thus, the project area likely provides only marginal potential habitat for monarch butterflies. Wildfires, prescribed burning, or the combination of conifer removal and prescribed burning can increase the abundance of flowering herbaceous vegetation (The Xerces Society 2018). Thus, the project should improve the availability of nectar plant species used by monarch butterflies, at least to a modest degree. **Cumulative Effects** – On NFS lands in the Sweet Creek and Big Muddy Creek Watersheds, no other timber sales or fuels treatment projects are planned or would be concurrently active with the Sweet-Ione project. The forest has an ongoing program of treating invasive weeds, including those plant species that are utilized by bees and other pollinators. It is our standard practice to control noxious weed infestations on roadsides prior to the start of a timber sale on NFS lands. Any herbicide applications on NFS lands in the Sweet-Ione Project Area would be targeted, limited in extent, and intended to replace noxious weeds with desirable native plants per Forest Plan Desired Condition *FW-DC-IS-01. Integrated Management for Invasive Species* (page 68). During routine maintenance of vegetation in the powerline corridors, the utilities normally leave plants less than 10 feet high untouched. Laval host plants and other plants that do not have a tall growth form are not targeted with herbicides. Herbicide application in the corridors is selectively applied to individual plants or small groupings of brush using a backpack or ATV mounted sprayer (Jahn 2020). Livestock grazing and summer recreation in the project area have the potential to cumulatively impact food plants and low cover for butterflies (see Appendix B). However, these potential effects should be mitigated by the promotion of flowering plants where they exist in treatment units.

6.4.1 Degree to Which the Project Addresses the Wildlife Issues

Table 17. Comparison of current condition and Proposed Action in relation to the wildlife issues.

Resource Indicator	Measure (Quantify if possible)	Current condition	Proposed action
lynx habitat components	Provide a mosaic of stand types including dense, young stands and mature, multi-storied stands that have the capability to provide dense horizontal cover.	276 acres (young) 3,679 acres (mature) 1,342 acres (den)	276 acres (young) 3,607 acres (mature) 1,342 acres (den) Potential recruitment of 214 acres of snowshoe hare habitat in 20 years (regeneration harvest units)

Resource Indicator	Measure (Quantify if possible)	Current condition	Proposed action
motorized access	open route miles, densities drivable route miles, densities	84 miles open (2.63 miles / square mile) 109.9 miles (3.45 mi. / square mile)	71 miles open (2.23 miles / square mile) 96.9 miles (post-project) (3.04 miles / square mile)
secure habitat	acres further than 500 meters from open and restricted-use roads	2,785 acres	3,937 acres (post-project)

7.0 Compliance with the Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The project as proposed would be consistent with Forest Plan (USDA 2019) desired condition, objectives, standards and guidelines for T&E species and other wildlife. The project would be consistent with standards, guidelines, and recommendations in the grizzly bear recovery plan (USDI 1993) and other guidance for grizzly bears (USDI et al. 1986, USDI 2020). The project would be consistent with management recommendations in the Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013).

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Appendix A: Risk Assessment Procedure for Threatened and Endangered Species

Forest Service (Region 6) Supplement 2600-90-5, FSM 2672.24b-2676.17e

Likelihood of Adverse Effects

None: Activity will not affect habitat or population (no further risk assessment is needed).

Low: Activity controllable by seasonal or spatial restrictions and not likely to affect habitat or populations.

Moderate: Activity not completely controllable or intense administration of project needed to prevent adverse effects on habitat or populations.

High: Activity not controllable and adverse effects on habitat or populations likely to occur.

NOTE: Any adverse effects to federally listed species will require initiation of consultation process.

Consequence of Adverse Effects

Low: None, or questionable adverse effect on habitat or population. No cumulative effects expected.

Moderate: Possible adverse effects in habitat or on population. Cumulative effects are possible.

High: Obvious adverse effects on habitat or population. Cumulative effects are probable.

Risk Index

None=0

Low=1

Moderate=5

High=10

Multiply Likelihood value times Consequence value to determine Risk value.

Risk Value / Action

0 Proceed with project.

1-10 Proceed as planned.

10-50 Modify project if feasible to reduce risk.

0-100 Project must be modified, cancelled or have further analysis done.

NOTE: Subsequent activities in the assessment area with index of 25 or more must be modified if previous effects have not been mitigated.

Appendix B: Other recent, (within 10 years) ongoing, or potential future projects / activities within the Big Muddy and Sweet Creek Watersheds

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
Vegetation management					
timber harvest	sales on NFS lands	2010-2020	June 1 - October 31	No	Approx. 27 acres of uneven aged harvest (reduced canopy) since 2010. Approx. 9,023 total acres harvested since 1954.
timber harvest	sales on DNR, PVT	2010-2020	June 1 - October 31	No	Approx. 298 acres of openings created on PVT, 15 acres on DNR since 2010. Approx. 468 acres of uneven-aged harvest (reduced canopy) on PVT, 291 acres on DNR since 2010. Known total harvest acres since 2002 = approx. 1,611 acres PVT, 450 acres DNR.
timber harvest	active / planned harvest on all ownerships	2021 -	June 1 - October 31	No	Besides Sweet-Ione, no timber sales are active or planned on NFS lands. Approx. 181 acres of uneven-aged harvest ongoing on private land. Future harvest plans on PVT and DNR lands are unknown.
timber stand improvement	pre-commercial thin (FS)	2010-2020	summer - fall	No	Approx. 526 acres of young trees thinned in plantations on NFS land since 2010. Approx. 1,000 acres of young trees thinned since 1971.
reforestation	tree planting (FS)	2010-2020	spring or fall	No	No acres planted on NFS land since 2010. Approx. 600 acres of created openings on NFS land planted since 1980.
noxious weed control	spray herbicides to eradicate weeds on roadsides, landings, meadows (FS)	ongoing, as needed	spring - early summer	No	Potential for non-target, native plants to be killed or injured. This could lead to local reductions in cover and forage plants for sensitive invertebrates and bees. Should lead to local, long-term improvements in the coverage of existing native forbs, grasses, and non-native green forage plants. Only herbicides formulated for use near surface waters would be applied around riparian areas.

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
Road management	**Specific project / activity**	**Approx. years active**	**Normal season of activity**	**Lynx range?**	**General effects to forest habitats and wildlife**
new road construction	construct roads for forest management	2010-	summer - fall	Not on NFS	Essentially all new roads built on NFS lands are closed post-sale. New roads on private timber lands are typically closed to public use. Approximately 3 miles of new road access on state timber lands since 2010.
road maintenance	maintain signs, drainage & bridges / repair failures / grade, lay rock in road prisms / brush roadsides	ongoing, as needed	summer - fall	No	Disturbance from equipment operation and impacts to soils confined to road corridors, rock pits, and borrow areas. Minor, local impacts to vegetation.
road easements	FS easements granted to BPA (4 roads), PVT (1 rd.)	permanent	year-round	No	Possible connected actions (timber sales) on private ownerships.
closure maintenance. & monitoring	maintain / monitor gates and native material closures (FS)	ongoing, as needed	summer - fall	No	Potential improvements in closure effectiveness, enhancement of seclusion habitat.
Fire and fuels management					
fuels reduction	recent fuels reduction treatments within harvest units (FS)	2010-2020	summer, fall	No	Approx. 50 acres machine work (masticate, grapple pile) on NFS lands. Unknown acreage of fuels reduction on private or state lands.
forest fire suppression & rehabilitation	initial attack, control, containment, mop-up, monitoring, BAER activities (all ownerships)	as needed	spring-fall	Yes	Varying levels of human disturbance. Impacts to vegetation and soils dependent on fire size and intensity. Mostly hand crews and fire vehicles used on small fires. On larger fires heavy equipment and aircraft may also be used. Most fires confined to small acreages. Fire suppression could contribute to the incremental build-up of forest fuels, potentially leading to large-scale, stand-replacing fires over the long-term.

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
forest fire suppression & rehabilitation	Baldy Mountain Fire (FS)	2015	summer	Yes	Approximately 75 acres burned within the Sweet-Ione Project Area. High severity (stand-replacing) effects in the highest elevations, mixed severity elsewhere. Pulse of snags created within the fire perimeter, most of which will fall to the ground in 1-3 decades, leading to a decades-long gap in snag availability. Rehab. activities included dozer trail rehabilitation, seeding, installing erosion control structures.
Habitat improvement					
wildlife habitat improvement	improve road closure effectiveness, create snags, rejuvenate woody browse with prescribed fire (FS)	2010-2020	spring-fall	No	Improved the effectiveness of 10 closed road entrances with piled slash & plantings to increase seclusion for elk and other wildlife. Topped 22 green trees to supplement existing snags in timber sale units. Used hand crews to under-burn approximately 100 acres of shrubs / hardwoods in Jim Creek area to improve browse for elk.
Recreation					
recreation facilities / site maintenance	maintain dispersed campsites, Hank's Butte snowmobile staging area (FS)	as needed	year-round	No	Maintain signs, remove trash / litter, pump toilet. Insignificant or discountable effects.
motorized recreation (summer)	full-sized vehicle, OHV operation	ongoing	spring - fall	No	Motorized disturbance mostly confined to open routes as shown on the CNF Motor Vehicle Use Maps. Occasional local impacts to soils and vegetation from illegal off-road travel.
OHV damage mitigation	Damage Response Team program (FS)	as needed	spring - fall	No	Restore OHV hill climbs, pioneered trails, mud bogging areas, etc. by scarifying / leveling exposed soils, seeding, planting. Block user-created trails with fencing, piled slash, boulders. Install signage.
motorized recreation (winter)	over-the-snow vehicle operation on designated trails	ongoing	winter	No	Insignificant or discountable impacts to vegetation. Motorized disturbance mostly confined to designated routes. Some snowmobile "play" in powerline corridors that area coincident with designated routes.

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
non-motorized recreation	dispersed camping, target shooting, geocaching, cross-country skiing, snowshoeing, sledding	ongoing	year-round	unknown	All activities tend to be intermittent in the watersheds. Potential disturbance mostly confined to campsites and road corridors. No hiking trails in the watersheds. Camping in these watersheds mostly confined to the hunting seasons. Potential impacts from camping include soil compaction, damage to trees and other vegetation, improper sanitation, littering, refuse dumping. Potential for wildlife to access human foods at campsites, possibly leading to human-wildlife conflicts.
harvest of game species	hunting, fishing, trapping, antler shed gathering, game camera operation	ongoing	per WDFW regulations	Yes	Game species managed by WDFW to maintain healthy, productive populations at sustainable harvest levels. Varying levels of disturbance / stress to wildlife. Potential for incidental take of TES species due to mistaken identification by hunters, fishers, trappers, or through poaching.
Special use permits					
utility corridor maintenance	FS special use permits for power transmission lines (BPA, PUD), and buried telephone line (POTC)	typically, every 3-5 years	spring - fall	No	Periodic maintenance of permanent, linear forest openings (power lines) via small tree removal, brush topping and spot herbicide application. Disturbance from chainsaw operation. Disturbance from aerial (helicopter) monitoring, twice annually (Jahn 2020).
military training	FS special use permit for the US Air Force Survival School	episodic (not every year)	year-round	unknown	Small scale impacts to vegetation from trampling / soil compaction, bough collection, berry collection, etc. Some harvest of fish and small mammals. Motorized disturbance mostly limited to drivable road systems. Occasional high-level disturbance from aircraft use.
mineral prospecting	using dredges and other power equipment in Big Muddy Creek	ongoing	Aug. 1 – March 15 (WDFW regulations)	No	If dredging occurs in the watersheds, it is likely on an intermittent basis. Disturbance from human presence, motorized equipment. Equipment operation could impact fish spawning gravels, and input sediment to the

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
					water column.
mineral prospecting	using gold pans and other hand-held, non-motorized equipment in all streams	ongoing	year-round	No	If gold panning occurs in the watersheds, it is likely on an intermittent basis. Low level disturbance from human presence.
forest products collection	FS, DNR special use permits for collection of firewood, berries, mushrooms, floral greens, Christmas trees, landscape rock, etc.	ongoing	per FS, DNR regulations	unlikely	Local reductions in snags, down logs, berry crops, mushrooms, small conifers, etc., mainly within 200 feet of open roads. Disturbance from chainsaw use / human activity.
Range management					
livestock allotment	Tiger Hill Range Allotment (FS) operation / administration	ongoing	June 1 – Sept. 30	No	129 cow / calf pairs grazed annually in the Big Muddy Creek Watershed. Potential for local reduction of hardwood tree regeneration and riparian shrub density / diversity from livestock browsing. Potential for local impacts to stream banks, water quality from livestock trailing & watering. Potential for noxious weed spread on livestock fur and in feces. Potential for livestock / predator conflicts. Grazing reduces the rate of conifer encroachment into meadows. Grazing removes rank grasses and maintains grass vigor and palatability.
Survey and monitoring					

Management Action	Specific project / activity	Approx. years active	Normal season of activity	Lynx range?	General effects to forest habitats and wildlife
vegetation surveys and monitoring	Forest Inventory & Assessment (FIA) plots, other forest vegetation surveys and research (FS, DNR, PVT)	episodic	spring -fall	Yes	Motorized disturbance limited to drivable roads.
fish and wildlife surveys and monitoring	wolf trapping, radio monitoring of wolves & grizzly bears, surveys for goshawk nests, camera sets for rare forest carnivores, fish shocking, etc. (FS, WDFW, USFWS, KTI)	episodic	year-round	Yes	Motorized disturbance mostly limited to drivable roads. Occasional disturbance from aircraft use (USFWS, WDFW). Potential for stress or incidental mortality to wildlife captured for research purposes.

BAER – burned area emergency response
BPA – Bonneville Power Administration
DNR – Washington Department of Natural Resources
FS – USDA Forest Service
KTI – Kalispel Tribe of Indians
NFS – National Forest System
OHVs – off-highway vehicles
POTC – Pend Oreille Telephone Company
PUD – Pend Oreille County Public Utility District #1
PVT – private land
TES – threatened, endangered, and sensitive species
USFWS – USDI Fish and Wildlife Service
WDFW – Washington Department of Fish and Wildlife

Appendix C: Wildlife Resource Survey Log

Target species	Survey type	Results of survey	Approximate survey dates
elk, forest carnivores	Road status review	All roads classified as: open, restricted, or un-drivable	coincident with 2018-2019 field surveys
lynx	Lynx range stand review	Stands typed to lynx habitat components	2018: 7/5, 7/11, 7/16, 7/17, 7/25, 8/27 2019: 8/15, 8/27, 8/28, 9/10
lynx	Snowmobile track surveys (WDFW)	No lynx detected.	winter of 2008
lynx	Remote camera traps with volunteers (2 sites)	No lynx detected	winter of 2013
northern goshawk	Broadcast taped calls, specific searches for active nests	Two new active nests detected. Cooper's hawk nest incidentally detected.	2018: 7/2, 7/5, 7/9, 7/11, 7/12, 7/18 2019: 6/9, 6/12, 6/18, 6/20, 6/24, 6/25, 6/26, 7/10, 7/15, 7/16, 7/29 2020: 6/17, 7/15, 7/21
forest carnivores	Remote camera traps (8 total sites)	Species detected: moose, elk, white-tailed deer, coyote, bobcat, cougar, black bear, snowshoe hare, striped skunk, raven, songbirds	2018: 8/9 through 10/24 2019: 6/19 through 10/15
all	General stand exams for wildlife habitats	Data collected on stand structural stage, vegetation type, tree species, understo plant species, canopy closure, dead wood habitats, wildlife sign, etc.	2018: 7/12, 7/17, 7/25, 7/26, 8/7, 8/9, 8/15 2019: 6/12, 6/18, 6/24, 6/26, 7/16, 7/19, 8/5